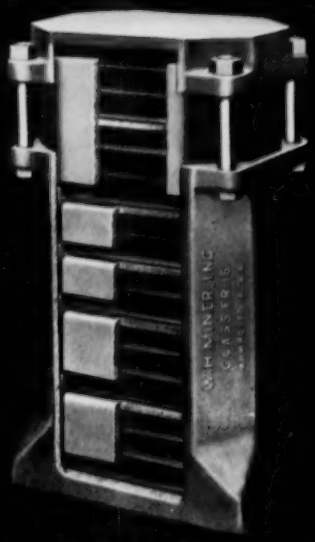
Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

formerly Railway Mechanical and Electrical Engineer

SEPTEMBER 1955

One of Five Specialized Railway Age Publications



SECTIONAL VIEW

This gear is self-contained and requires no special tools or effort to install.

MINER FR-16 RUBBER DRAFT GEAR

This draft gear specification favors high maximum capacity with low oil pressure which is the exact characteristic of the FR-16 Gear. This gear has an A.A.R. capacity of 39,400 foot pounds with a draft gear reaction below the acceptable maximum pressure that can be safely transmitted through a coupler shank. Desirable initial compressing capacity prevents unnecessary coupler movement or slack during train operation.

W. H. MINER, INC.

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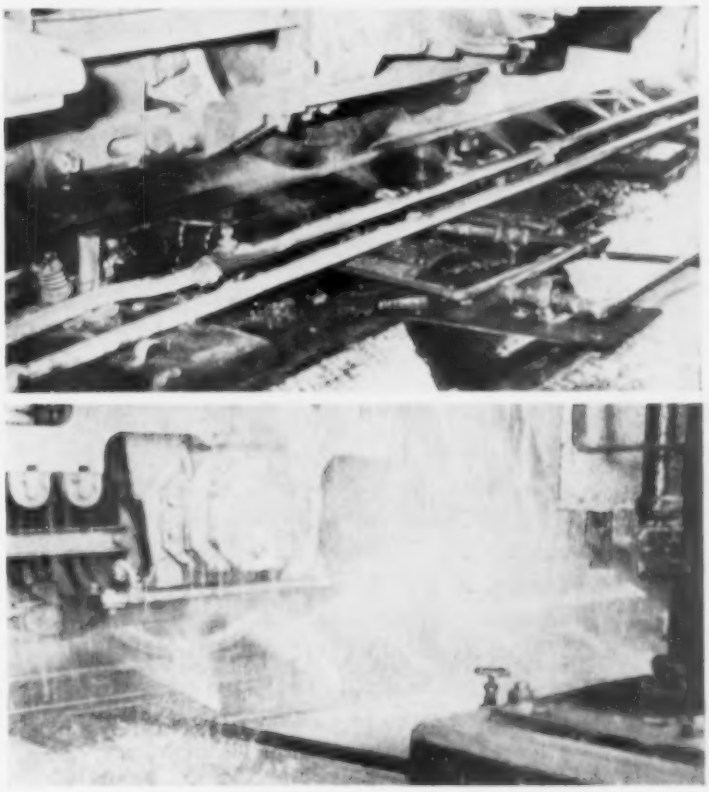
Announcing... **the best-kept secret in the industry!**

Brake-X is Buffalo-Unit's answer to the need for improved freight train braking. *Brake-X* is the result of years of research by Buffalo-Unit, the product of the same engineering "know-how" that made Unit Truck and Truslock the outstanding braking improvements since the invention of the air brake. *Brake-X* ...the industry's best-kept secret... will have its premiere at the Allied Convention Exhibit in Chicago, September 11-14, 1955. Come early to Space 240 Main Exhibit Hall, and be among the first to see this most remarkable of all Buffalo-Unit's engineering achievements.

BUFFALO BRAKE BEAM COMPANY • UNIT TRUCK CORPORATION

Save Money

Clean diesel wheels and trucks with automatic Oakite "track-trip" spray-washing



Oakite automatic "track-trip" wheel cleaning set-up saves money. It prevents solution and rinse water waste. Top picture, cleaning. Bottom picture, rinsing.

YOU ARE LOOKING at a set-up for cleaning and rinsing diesel wheels and trucks. It was designed by Oakite for a big Western Railroad. These pictures were taken at that yard.

THIS ROAD wanted to eliminate costly, time-consuming manual cleaning. They were looking for some simple, inexpensive mechanical method . . . one they could build themselves in their own yard.

HERE'S HOW IT WORKS. Pressure, transferred from wheel flange to track tripper, depresses valves for spray cleaning. Solution spray responds only to wheel pressure. Spraying stops as wheel pressure diminishes.

RESULTS. Considerable savings in solution upkeep and less waste of rinsing water since spraying occurs only as wheels enter spraying area. No time wasted for manual valve adjustments. No hand scrubbing.

If you'd like more information on washing diesel wheels and trucks just drop us a line. We'll be glad to send you complete details, drawings.

Oakite Products Inc., 46 Rector Street, New York 6, New York

OAKITE

RAILWAY DIVISION

WABCO®
takes the punch and bounces back

Wabco's ability to bounce back and regain its original contour after deflection has made it amazingly successful in air brake packing cups, as well as seals and gaskets. It is this unmatched resiliency that has reduced brake system leakage to a previously unattainable minimum. It made it possible to extend maintenance intervals because of the longer service life.

To maintain top performance, be sure to use genuine Wabco parts. Specify them by name. Each Wabco Packing Cup carries the trade mark, date of manufacture, mold number and piece number. Thus you can order and get the same high quality parts time after time.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PENNA.

WABCO Dated Packing Cups

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RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal

SEPTEMBER, 1955 - **VOLUME 125, NO. 9**

Editorials 63
Ton-Miles vs. Maintenance; Fix It or Describe It

Motive Power and Car

EMD Reefer Designed for Minimum Maintenance 67
Body of "Frigitrater" completely separated from steel underframe

ACL Tries New Type Flooring 72
Gives nailable surface; impervious to oil and grease; smooth and watertight

C&O Installing Fleet of Axle Flaw Detectors 74
Ultrasonic axle inspections becoming routine mechanical operations at many terminals

What Mekydro Torque Converter Can Do 77
GT diesel locomotive soon to be followed by diesel-mechanical passenger units

Two Features Distinguish New GN Car Shop 80
New production scheme for freight cars with unusual welding layout

Concrete Boxes Speed Up Yard Service 87

Electrical Section

Air Conditioned M-U and Locomotive-Hauled Coaches 88
Gamma Ray Radiography Used Without Hazard to Operators 91
Roundhouse Drop Pit Adapted to Diesel Needs 92
Vernatherm Tester 93
Flashovers—How the C&NW Has Almost Completely Eliminated Them 94
Photoelectric Flashover Protection 95
Sand Blast Cleaning of Armature Cores 96
Armature Rotating Device 97

Departments

Equipment New Ideas—New Uses 6
News 14
Personal Mention 14
Supply Trade Notes 19
Letters to the Editor 63
New Books 65
???????? 102
Index to Advertisers 136

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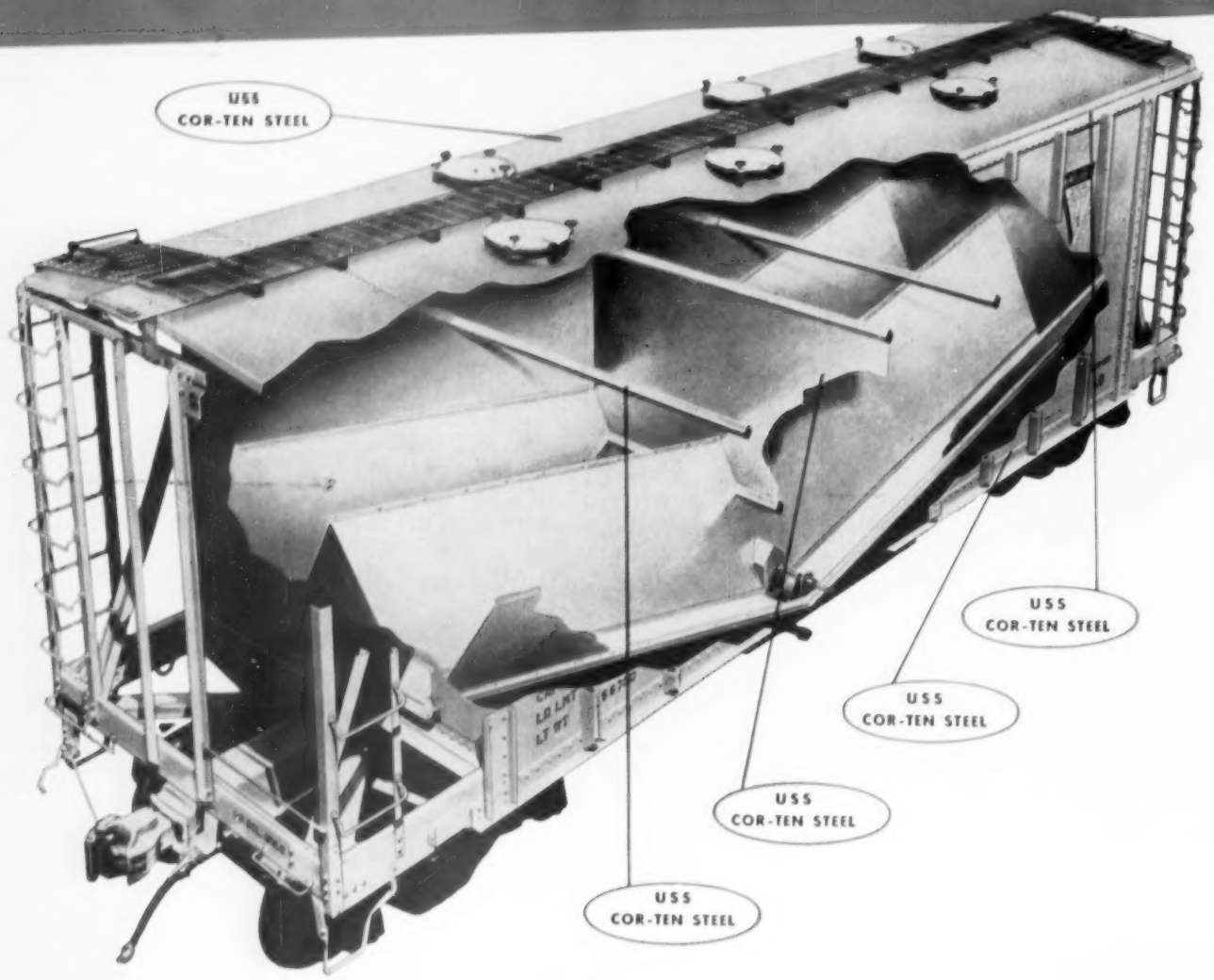
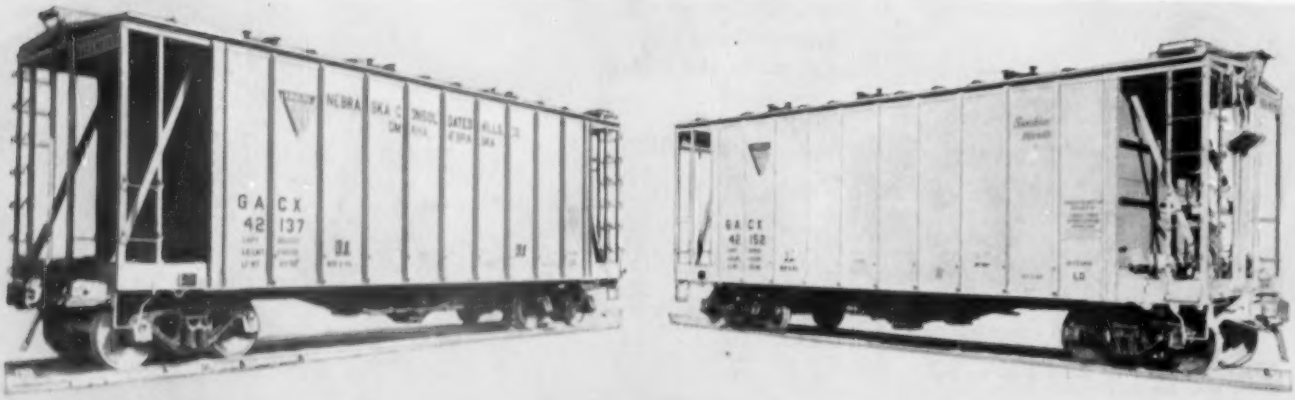
TWENTY-TWO YEARS OF PERFORMANCE

190,000 freight cars have been built





USS HIGH STRENGTH STEEL

better with USS COR-TEN Steel since 1933

In General American's new AIRSLIDE® cars

USS COR-TEN Steel

was selected to minimize corrosion and keep maintenance costs low

The increased demand by shippers of dry, granular, and powdered bulk materials for a special car that would protect the lading and be easier to unload has been answered by the General American Transportation Corporation, Chicago. It's the new AIRSLIDE Covered Hopper Car.

How well the AIRSLIDE car fills the bill can be deduced from the fact that since its introduction less than two years ago, more than 600 are today in service or on order.

Shippers who hitherto have not found bulk handling feasible are now using these cars and are realizing substantial savings in container, dunnage and labor costs. Improved sanitation and reduced damage from contamination are additional advantages these shippers appreciate.

To solve the difficult problem of high-speed unloading, the GATX engineers have utilized the Fuller* Airslide principle by which the lading is aerated and fluidized, causing it to flow like water to the double hopper doors.

They selected USS COR-TEN Steel for car construction for two reasons: (1) to obtain high strength with no increase in weight, and (2) to reduce interior corrosion, caused by condensation, to a minimum.

USS COR-TEN Steel's high yield point of 50,000 psi. and its high resistance to atmospheric corrosion, 4 to 6 times that of carbon steel, made it a logical choice on both counts.

COR-TEN Steel's high corrosion resistance plus the fact that paint adheres more tightly to it are further assurance that these AIRSLIDE cars will maintain their attractive appearance longer and will better resist the attack of atmospheric corrosion both inside and outside.

By combining a unique car design with superior COR-TEN Steel construction, the builders of the AIRSLIDE car have made available to shippers an efficient means for transporting commodities never successfully handled in bulk before—and a car that can be confidently counted on to render long time service with the least amount of maintenance.

Find out how readily USS COR-TEN High Strength Steel can be adapted to your designs. Our engineers who pioneered its application in freight equipment of every type can place at your disposal an unequalled experience in its use that cannot fail to be helpful. We welcome your inquiries, and the opportunity to work with you.

(*The Fuller Company: A subsidiary of General American Transportation Corporation.)

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

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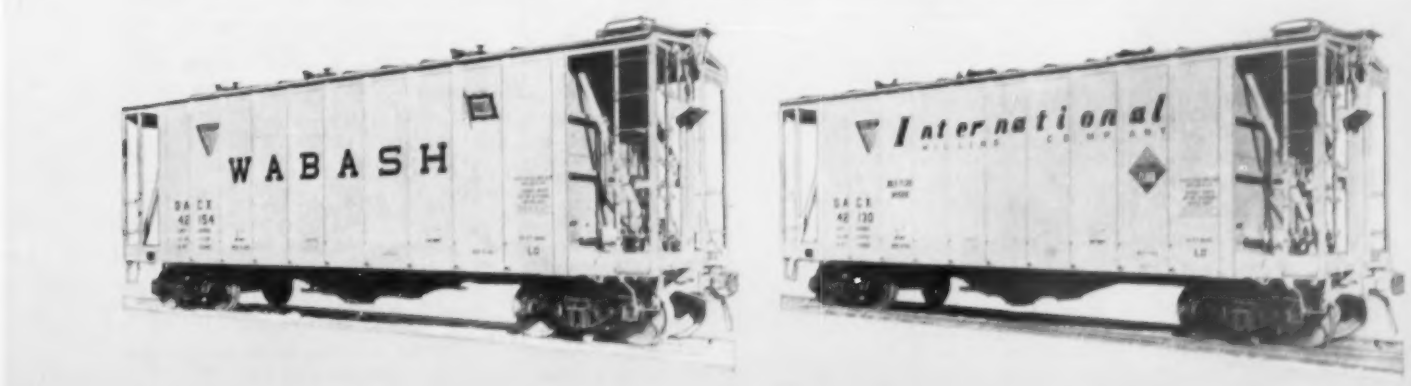
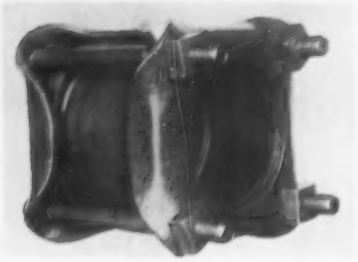


UNITED STATES STEEL



The flexible coupling is made in sizes to over 24-in.; the flexible fitting (right), in sizes from ⅜ to 2-in.

Flexible Couplings and Fittings for Diesels

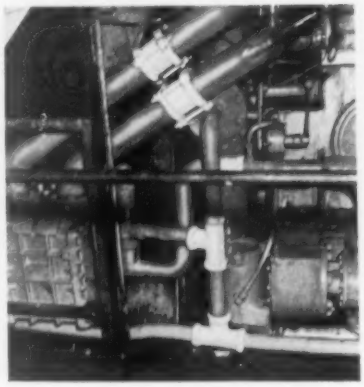
Two years ago the mechanical department of the Erie first began testing flexible pipe couplings for their diesel locomotives. The results of their year-long test encouraged the Erie to begin replacement of all rubber hose connections.

The end of the first year of conversion found 30 per cent of Erie diesels equipped with flexible pipe couplings. Not one leak had occurred on pipe joints connected with flexible couplings and there had been no locomotive failures or delays resulting from leaking joints. Not one coupling or fitting had to be replaced after installation. A saving of about $50 per locomotive per year on material costs resulted. Erie estimates a total yearly saving of $20,000 when all diesel piping has been converted.

The success of Erie's conversion program is presently being duplicated by similar programs on other railroads. They are changing to flexible couplings for joining piping on all types of diesel locomotives. The couplings chosen by Erie for their initial test and subsequently installed on their diesels, were furnished by the Dresser Manufacturing Division of Bradford, Pa. The Erie used, two basic products, couplings and fittings. Both operate on the same principle—the compression of specially compounded rubber gaskets to effect a permanent, bottle-tight seal. The main difference lies in the method of attaining this compression.

The Dresser couplings consist of a cylindrical steel middle ring, two resilient gaskets of special compound, two steel follower rings and a set of high-strength steel trackhead bolts. The follower rings confine the outer ends of the gasket. Tightening the bolts, which extend through these rings, compresses the gasket in the spaces formed by follower rings, middle ring flares and the pipe surface to form the seal. Couplings are available in sizes ⅝-in. through 24-in. and larger.

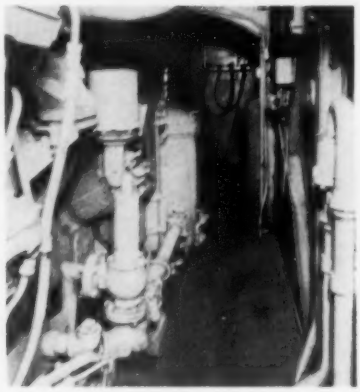
The fittings are made especially for small piping ⅜-in. to 2-in. They have essentially the same parts as the couplings. The fitting body corresponds to the middle ring; there are two gaskets with retainer cups to confine them, and threaded end nuts in place of the bolts. When the end nuts are screwed on the threaded body they compress the gaskets to make a bottle-tight seal.



Relocation of heat exchanger on a Baldwin 600-hp switcher was done with the aid of Dresser fittings.

The Erie quickly learned that the great advantage of couplings and fittings for diesel piping lies in their strength, ease of assembly and flexibility. The high-strength steel or malleable iron bodies will easily withstand pressures of 150 psi with an ample safety factor. In Dresser couplings and fittings the specially compounded gaskets which are the only parts in contact with the pipe actually float in the joint. This absorbs vibration in the line and allows up to 6 degrees of misalignment. Flexible pipe couplings and fittings take up expansion and contraction caused by diesel operating temperatures and changing weather conditions. Since no exact pipe fitting or threading is required, installation time is kept to a minimum. The only tool required is a wrench.

The Erie found that flexible couplings and fittings are more than replacement parts. Now major diesel piping relocations to provide greater efficiency and serviceability are practical because of the flexible couplings and fittings. An example in the Alco 1600-hp road freight locomotive is the oil system which has been changed from a parallel to a series hook-up. Standard plain-end pipe was cut to nominal lengths and connected with Dresser couplings and fittings. These not only eliminated exact pipe fitting but also provided the required flexibility and greater strength in steel pipe and steel connections.



Piping changes in the oil system of a 1,600-hp Alco freight unit included the use of Dresser couplings.

Engine-water outlets to radiators on an EMD unit were changed with a special Y fitting including couplings.

Similar benefits were realized on Baldwin 600-hp switchers where relocation of the heat exchanger necessitated piping changes. On EMD Locomotives, the "Y" connection from the engine to the radiators has often been a trouble spot because of the excessive vibration and high temperatures. Dresser developed a special coupling for the Erie to use at this spot which has been adopted as standard after testing.

These are but a few ways that flexible couplings and fittings have helped the Erie. These couplings and fittings are presently being installed by other railroads across the country. *Dresser Manufacturing Division, Bradford, Pa.*

Brazing Flux

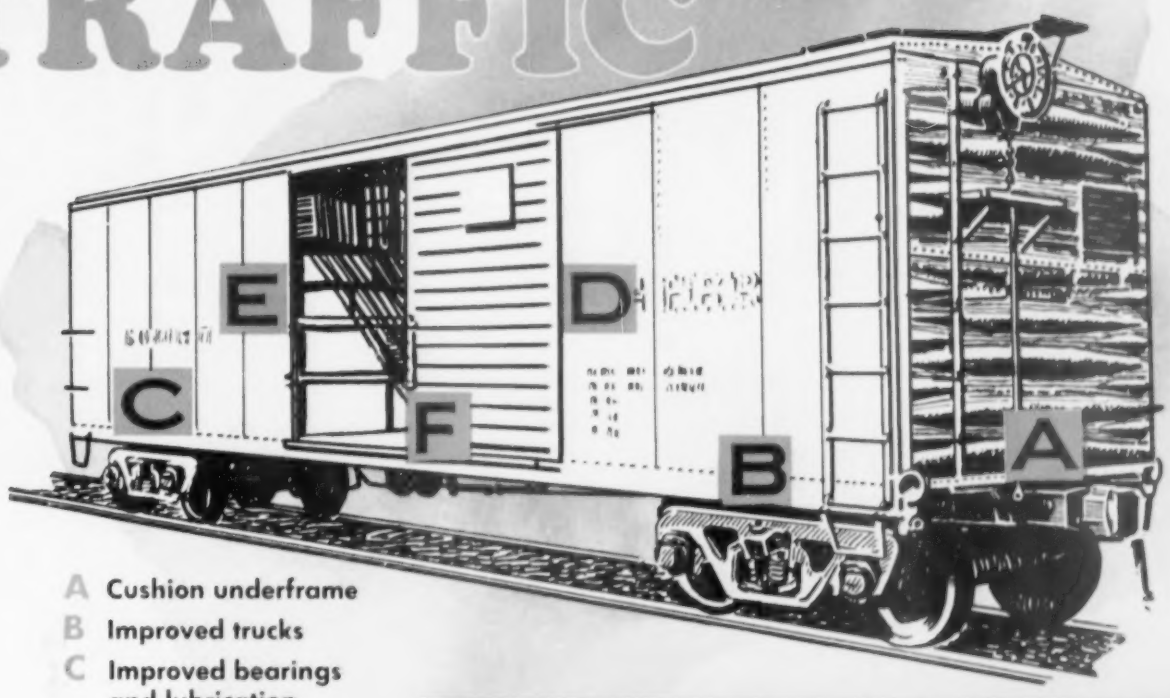
A flux for silver alloy brazing of stainless, chromium heat resisting alloys, chromium and tungsten carbides, Type B-1, is designed to reduce oxides of the refractory metals while protecting the underlying metal from further oxidation during brazing.

The flux, according to the manufacturer,

(Continued on page 10)

....CAR.....

to sell PREMIUM TRAFFIC



- **A** Cushion underframe
- **B** Improved trucks
- **C** Improved bearings and lubrication
- **D** Wide doors
- **E** Load retainer
- **F** Heavy surfaced floor

How come? It's a premium car equipped for easy loading, smooth, fast rolling, and providing a high order of lading protection. It's the type of car shippers are begging for . . . the kind of car that will persuade them, once again, to ship premium freight by rail.

Of equal importance, is the premium car's proven lower maintenance costs. Studies indicate that, were premium cars in general use, car maintenance costs would be cut in half.

Your inquiry invited.

WAUGH HIGH CAPACITY
Cushion Underframe
A
. . . a vital feature of the premium car providing extraordinary protection to both car and lading against high speed impacts.
90,000
car and lading
protection.

WAUGH EQUIPMENT COMPANY, 420 Lexington Ave., New York 17, N. Y.

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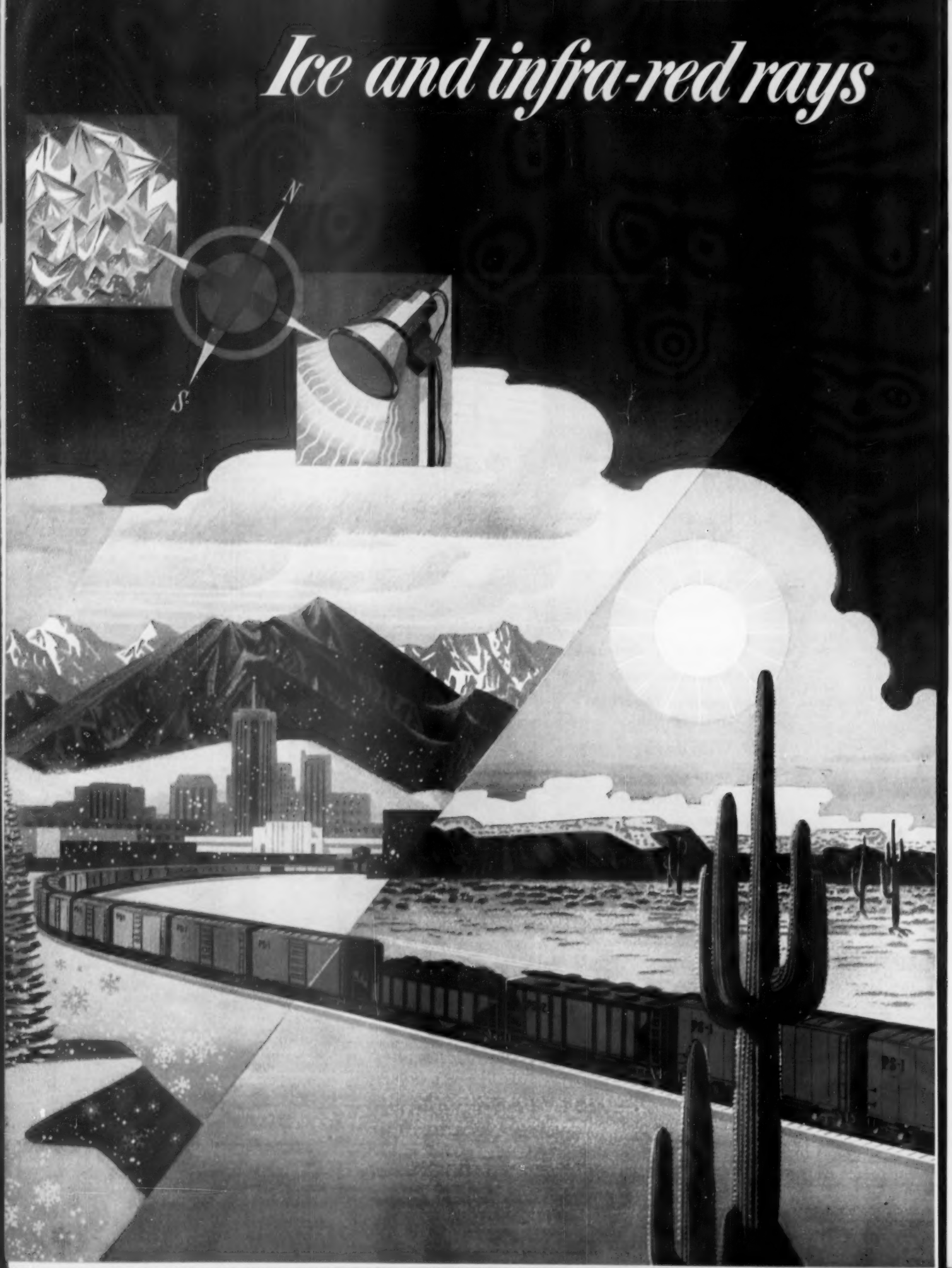
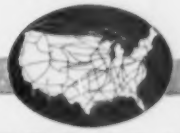
Ice and infra-red rays



simulated the weather

on the



GREAT AMERICAN RAILWAY
System

Weather wages war on freight cars. In their lifetime most box cars encounter all of the extremes many times as they are shuttled back and forth over the 402,603 miles of track that make up the Great American Railway System.*

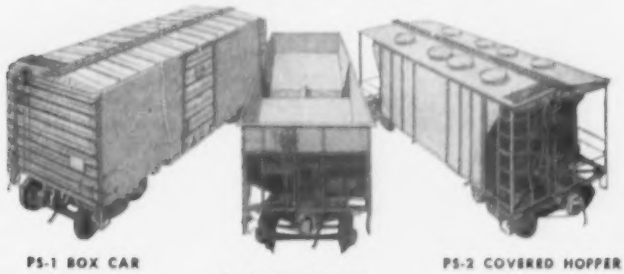
To know exactly how the PS-1 Box Car will perform in cold areas, a sample car is frequently impact tested, in the laboratory, with its welded draft lug and bolster assembly packed in dry ice. To assure superior performance wherever it goes, PS-1 materials and construction samples are proved in accelerated life tests under intermittent sun-like infra red rays and showers of corrosive salt sprays.

These and the many other laboratory findings are augmented by "on line" reports of Pullman-Standard's sales and service engineers. They study the success and failures of all types of construction on cars of all makes. Their reports contribute to the design and building of cars that will successfully meet today's and tomorrow's operating conditions and requirements.

Like the PS-1, the PS-2 Covered Hopper Car and the PS-3 Hopper Car are quality cars efficiently built to produce more ton miles of revenue at the lowest cost per year of service. If you are interested in the modern trend in freight car construction write for booklets describing these cars.

*A typical box car moves, in one year, on 39 different roads, including two or more trips on 24 roads. (A.A.R. data)

Built to serve best on the



PS-1 BOX CAR

PS-3 HOPPER CAR

PS-2 COVERED HOPPER

GREAT AMERICAN RAILWAY SYSTEM

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

(Continued from page 6)

has an ability to withstand heating at 1,400-1,600 deg F for short periods and to increase its life at lower brazing temperatures. It contains a strong deoxidizer to regenerate the flux during heating cycle.

Among other applications are its use with AMS 4772 brazing alloy, flow point 1,515 deg F, for brazing jet engine compressor blades. *Handy & Harman, 82 Fulton street, New York 38, N. Y.*

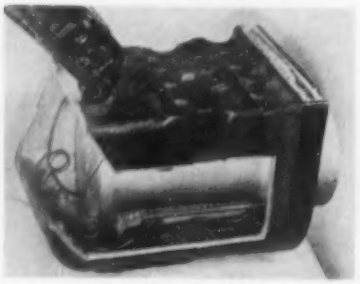
Variable-Delivery Gear Pump

This variable-delivery gear pump, Model FV1, can be adjusted to deliver lubricant at any rate from 3.5 to 10.5 gph. Rate of flow can be controlled while the pump is operating by moving the regulating screw by hand, or automatic control can adjust output in stages of 1.5 gph. Positive delivery is accomplished without throttling. It is claimed that there is constant and uniform delivery with lubricants of different viscosities, and that little heat is generated during pump operation. Designed for rotary drive, the pump is 2⅝ x 3⅛ x 3½ in. *Nathan Manufacturing Corporation, 45-02 Ditmars Boulevard, Long Island City 5, N. Y.*

Dry Chemical Fire Extinguisher

A new 10-lb pressurized dry chemical fire extinguisher carries underwriters' approval for a pressure range of from 150 to 250 lb. The advantage of such a wide range of working pressures, according to the manufacturer, is that the unit will work satisfactorily if only 150 lb of air pressure is available. When pressurized to 250 lb the extinguisher packs an extra hard hitting punch.

The unit features a pistol grip trigger release mechanism; a new dust and moisture-proof gage which shows at a glance the unit's charged pressure; and a diffuser horn which gives extra wide coverage of the discharge pattern to make the most efficient use of the dry chemical. *Walter Kidde & Co., Belleville, N. J.*



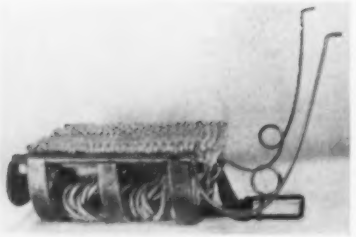
The Rolin lubricator in an AAR standard journal box.

Rolin Lubricator

The Rolin journal lubricator, which has successfully passed AAR acceptance tests and been applied to about 500 freight cars on 35 U.S. railroads, is a pad-type lubricator, widely used as standard equipment on European roads and adapted to American operating conditions by extensive research in this country during the last two years.

The device consists of a flexible steel framework which holds a lubricating pad in constant contact with the lower surface of the journal to apply and distribute the lubricant. Conduction of the oil from the reservoir in the lower part of the journal box to the surface of the lubricating pad is by capillary action. Provision is made to retain oil by means of a splash guard in the rear of the box, but the pad itself is said to hold sufficient oil to maintain proper bearing temperature for approximately 3,000 miles if for any reason the reservoir oil is lost.

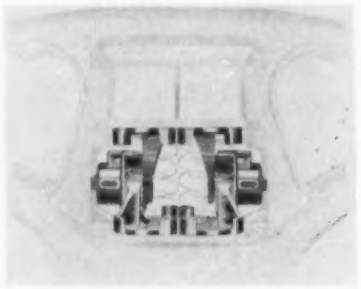
A special textile cord is used in the lubricating pad, both for the feeding cords and for the loops which form the top surface of the lubricating pad. Around the inner filling of the cord is a covering of other textile materials, the purpose of which is to feed the oil from the inner filling to the journal and to prevent particles of the inner filling from becoming detached and clogging the bearing. In addition, the outer covering prevents glazing of the softer material of the inner lining.



How special textile oil-feeding cords are applied in the lubricator.

The loop construction of the top of the pad also is designed to prevent glazing by permitting metal particles, dust and dirt to drop down where they cannot interfere with the oil flow or form a crust on the upper surface of the pad. It is said that the pad will not absorb water after once being soaked in oil, thus eliminating any possibility of freezing.

Advantages claimed for the Rolin device include: reliable and relatively low-cost lubrication of car journals without interruption due to waste grabs, glazing, or other interruption of oil supply; high oil-feeding capacity, up to 2.23 ounces per hour at 50 mph; ease of application in all standard journal boxes without jacking, special tools or skilled mechanics; convenient removal and inspection of the wedge and bearing without taking out the lubricator itself; reclamation and re-use after 100,000 miles of service, the equivalent of at least 36 months between repacking periods; practically no servicing; and important savings in oil, labor and maintenance costs. *Runknagel & Nichols, Inc., 165 Broadway, New York 6.*



Stabilizer Package

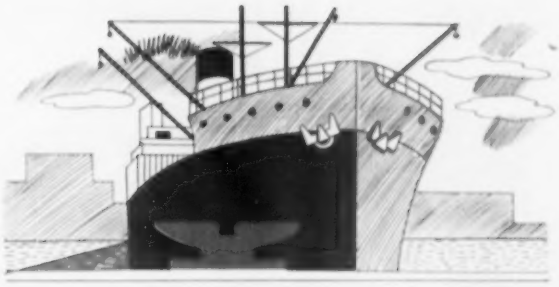
A ride stabilizer package that has no wedges or wedge action and bears against the vertical surfaces of the bolster spring opening below the column guides can be applied to double-truss side frame trucks either with or without spring planks. It is claimed that because there is no wedge action, this device is smooth acting at all times and that the danger of sticking is eliminated.

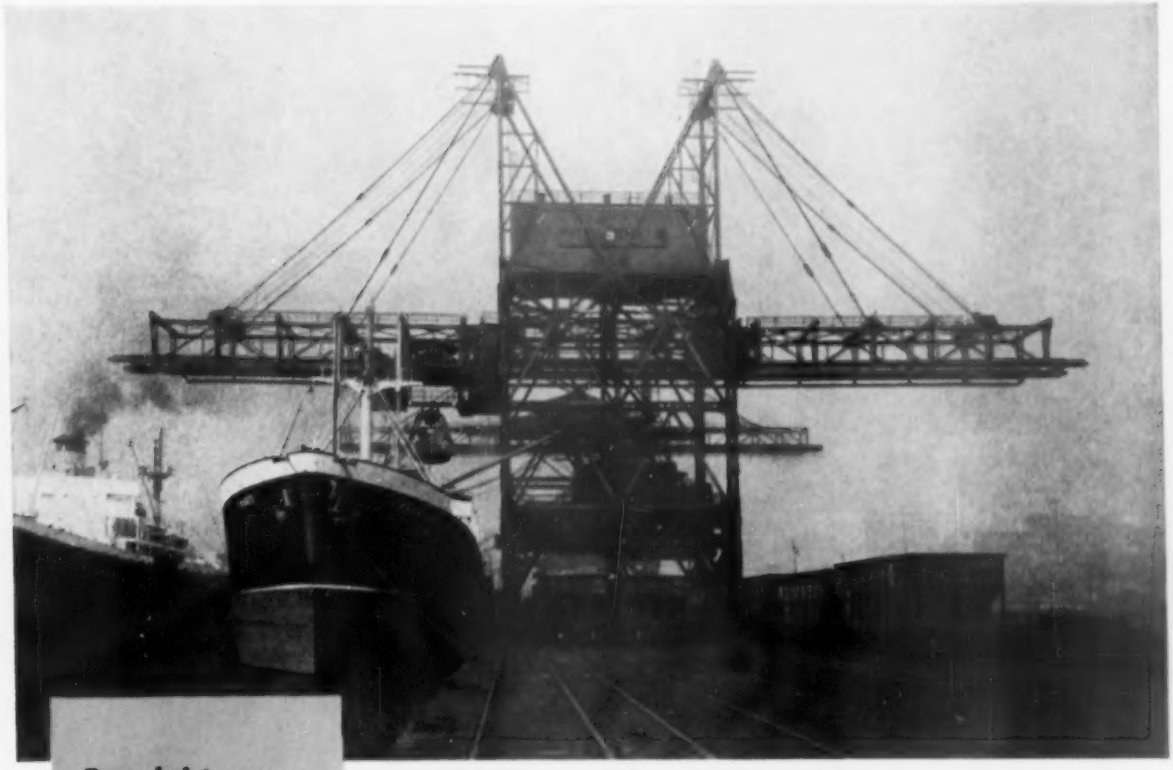
There is space to use five standard AAR spring groups in the side frame because of the design of this package. Its design also is said to prevent longitudinal shifting of the device. The top control portion of the package does not nest into the bottom control portion and this is intended to prevent failures caused by heavy lateral shock or lateral roll. There is three-way control of bolster movement and the unit should maintain the "squareness" of the truck.

To install, the package is positioned in the side frame after the bolster has been inserted and raised. Compression wedges

(Continued on page 22)

you can't show a profit while the cargo's in the boat





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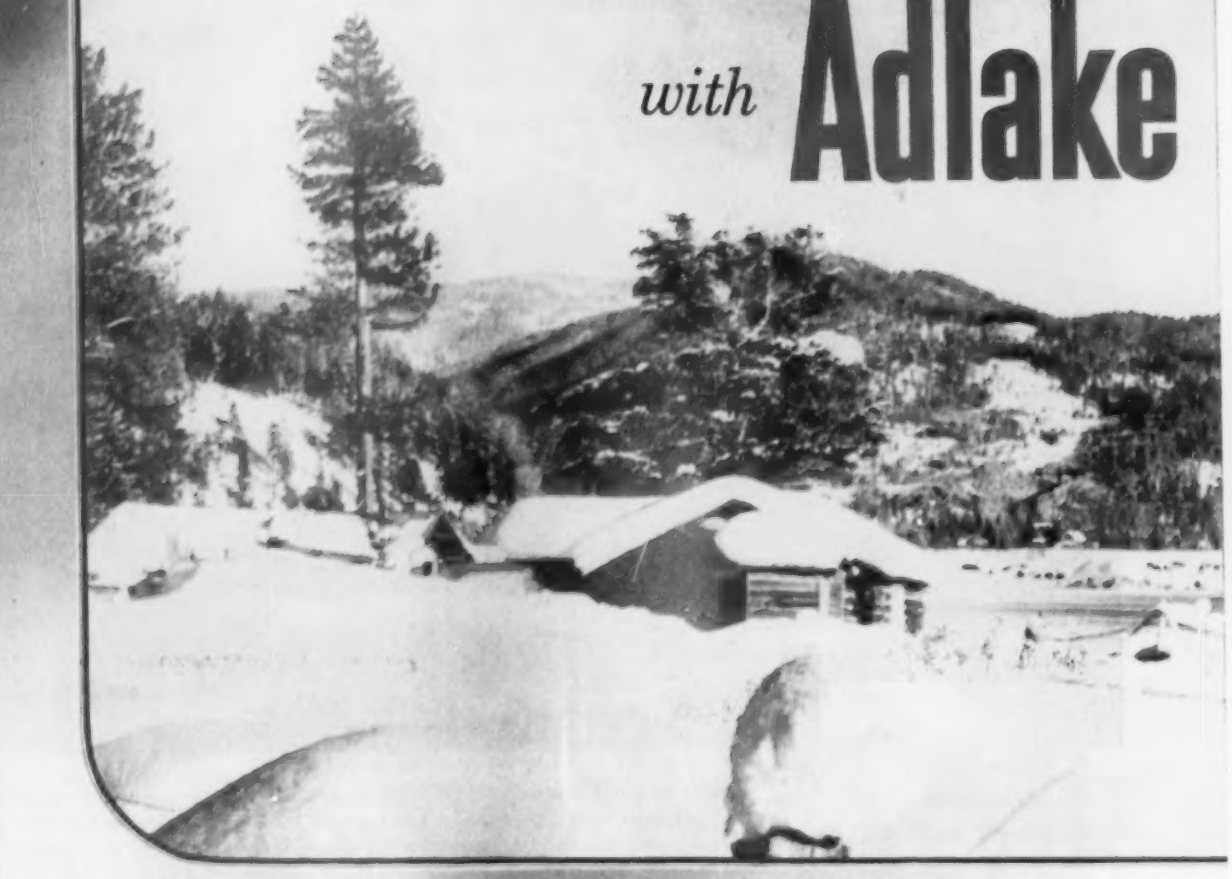

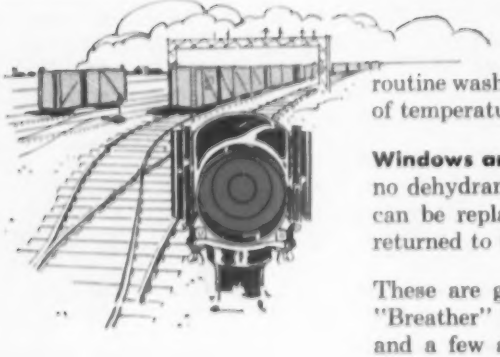

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NEWS

Equipment Orders As of July 1

Class I railroads installed 599 new locomotive units during the first six months of 1955, of which 590 were diesel-electric units and nine were electrics, the Association of American Railroads has announced. In the first half of 1954, Class I roads installed 788 new locomotive units, including 781 diesel-electrics and seven gas turbine-electrics.

New locomotive units on order by Class I roads on July 1 totaled 470, compared with 124 on order on the same 1954 date. On order this July 1 were 469 diesel-electrics and one electric, while those on order a year ago included 106 diesel-electrics, 10 electrics and eight gas turbine-electrics.

The serviceable freight-car fleet totaled 1,614,414 cars on July 1, as compared with 1,609,989 on June 1. The July 1 figure becomes 1,692,834 when cars owned by car-line affiliates of the Class I roads are included. The backlog of orders on that date totaled 27,848 cars.

Senate Confirms Hall For Loco. Inspection Post

Rejecting an adverse report of its Committee on Interstate Commerce, the Senate on July 29 confirmed President Eisenhower's appointment of John A. Hall as director of locomotive inspection at the Interstate Commerce Commission. The vote was 43 to 41.

A former special assistant to the grand chief engineer of the Brotherhood of Locomotive Engineers, Mr. Hall has been serving in the ICC position since last October on the basis of an interim appointment.

N&W To Construct New Car Shop at Roanoke

The Norfolk & Western plans to construct a new car shop facility at Roanoke, Va., to replace completely the present facility. The new installation will cost over $1 million and will occupy a ten-acre site extending some 1,800 ft from the entrance to the present Roanoke shops. It will be equipped with three 100-ft-wide crane bays —600 ft, 660 ft and 450 ft long, respectively —and a 100 by 180 ft fabricating shop at the west end of the 660-ft bay. The facility will be serviced by overhead and gantry cranes for handling material on and off major fabricating machines. The shop will be equipped to repair and build all types of freight cars.

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
1954					
January	2,583,485	3,082	3,797	6,879	375,561
February	2,445,214	2,953	4,066	7,019	348,370
March	2,658,757	2,196	3,637	5,833	455,813
April	2,570,518	3,079	5,149	8,228	312,411
May	2,713,511	4,416	6,510	10,926	248,353
June	2,662,375	6,597	9,617	16,214	164,202
July	2,678,234	7,956	10,912	18,868	141,946
August	2,696,135	7,568	9,742	17,310	155,756
September	2,614,432	6,740	8,882	15,622	167,355
October	2,852,825	5,182	6,985	12,167	234,472
November	2,717,219	2,515	3,467	5,982	454,232
December	2,751,644	1,501	2,294	3,795	725,070
1955					
January	2,714,070	1,813	2,701	4,514	601,256
February	2,517,483	2,266	3,970	6,236	403,701
March	2,830,398	2,717	5,076	7,793	363,197
April	2,787,706	3,471	6,485	9,956	280,002
May	2,931,850	4,860	8,664	13,524	216,788

PERSONAL MENTION

Baltimore & Ohio

FRANCIS B. RYKOSKEY, appointed general superintendent of motive power and equipment at Baltimore. A photograph and sketch of Mr. Rykoskey's career appeared in the June issue at the time of his appointment as assistant general superintendent of motive power and equipment.

Canadian National

G. E. MACCALLUM, master mechanic, Edmundston division, transferred to Island division at Charlottetown, P.E.I.

H. E. MOORE, master mechanic Island division at Charlottetown, P.E.I., retired.

J. A. H. BOURDEAU, road foreman of engines, Edmundston division, appointed master mechanic of the division, with headquarters at Edmundston, N.B.

Erie

Central Region

E. R. STICKEL, assistant foreman, Erie enginehouse, Northern division, appointed assistant foreman—special duty, office of general superintendent—motive power, at Pittsburgh.

Chicago & North Western

J. E. GOODWIN, vice-president in charge of operation at Chicago, elected executive vice-president. Mr. Goodwin was chief mechanical officer from 1945 to 1948.

Maine Central

TROTT R. KING, road foreman of engines, retired.

WILLIAM E. MALOY appointed assistant road foreman of engines.

New York Central

ROBERT D. TIMPANY appointed acting assistant master mechanic at Dewitt, N.Y.

Northern Pacific

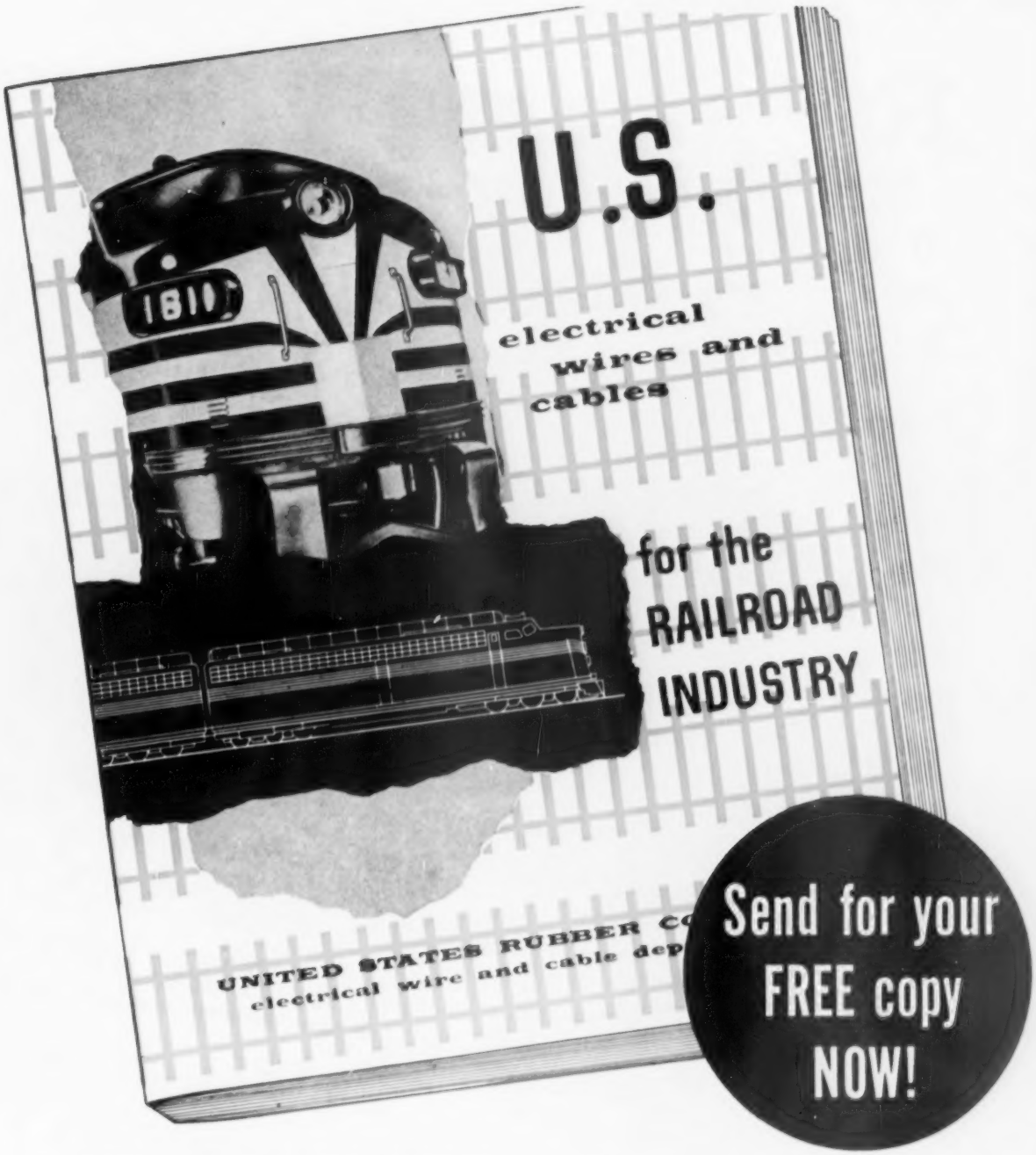
H. B. HOESLY, mechanical engineer at St. Paul, resigned.

E. C. ESTES, assistant to mechanical engineer, appointed mechanical engineer at St. Paul.

H. E. Brakke

H. E. BRAKKE, appointed superintendent of car department at St. Paul, Minn., as noted in the July issue. *Born:* Jackson, Minn., December 24, 1905. *Education:* Eastern State Teachers College; University of Minnesota College of Mechanical Engineering (B.M.E. 1931). *Career:* Served as laborer and machinist helper, on Chicago,

(Continued on page 18)



This just-published catalogue is for railroad men only. It contains data and specifications, tables and descriptive material about the following:

U. S. Insulation Compounds

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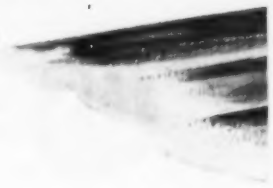


GREASE

PERSONAL MENTION

(Continued from page 14)

Milwaukee St. Paul & Pacific from 1923 until 1928; machinist helper on the Baltimore & Ohio until 1929, returning to CMStP&P in 1930 as a machinist helper. Became special apprentice on the NP at Brainerd, Minn., in 1931, subsequently serving as carman, draftman, assistant to general foreman, mechanical engineer, and assistant superintendent of car department.

St. Louis-San Francisco

O. H. SUMMERS, JR., appointed assistant electrical engineer of StLFS, not of N&W as mentioned in the August issue.

BLANKENBAKER, R. G. (not W. G.) appointed general foreman, car department, of StLSF at Tulsa, Okla., not of N&W as mentioned in the August issue.

Southern

RAYMOND D. GLENN appointed road foreman of engines. Headquarters, Birmingham, Ala.

Southern Pacific
San Francisco

B. M. BROWN, general superintendent motive power, has retired.

STANLEY M. HOUSTON, assistant general superintendent motive power, appointed general superintendent motive power.

Spokane, Portland & Seattle

DUNCAN J. RITCHIE, appointed general superintendent motive power of SP&S, at Vancouver, Wash., not of St-LSF as mentioned in the August issue. *Career:* Entered railroad service in 1904 as call boy on Great Northern. With Russian Railway Service Corps in Japan and Siberia from 1917 to 1919, returning to the GN in 1920 and becoming master mechanic at Willmar, Minn., in 1942. Became superintendent motive power of the SP&S in April 1955.

Union Pacific

J. J. CARROLL, general foreman at Omaha, Neb., appointed shop superintendent at Salt Lake City.

WILLIAM PARRY appointed engineer of locomotive construction and maintenance. Headquarters, Omaha, Neb. Formerly master mechanic of Western Pacific at Elko, Nev.

H. L. HOEFFEL, mechanical superintendent, transferred from Salt Lake City to Portland, Ore.

E. L. NEELEY, mechanical superintendent at Omaha, Neb., transferred to Salt Lake City.

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE AUGUST ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road	No. of units	Horsepower	Service	Builder
Canadian National	20[1]	1,200	Road switching	Canadian Locomotive
	32[1]	1,200	Switching	General Motors Diesel
	45[1]	1,750	Road	General Motors Diesel
	23[1]	1,600	Road	Montreal Locomotive
	50[1]	1,000	Road switching	Montreal Locomotive
	3[1]	1,000	Switching	Alco Products
Louisville & Nashville	10[2]	1,750	General purpose	Electro-Motive
	20[2]	1,600	General purpose	Alco Products
New York Central	16[2]	900	Yard switching	Electro-Motive
	45[2]	1,750	General purpose	Electro-Motive
Northern Pacific	1[3]	1,750	Road switching	Electro-Motive
	1[3]	1,200	Switching	Electro-Motive
Reading	6[4]	.....	General purpose	Fairbanks, Morse
Sacramento Northern	1[5]	600	.....	General Electric
Virginian	6[7]	1,600	All purpose	Fairbanks, Morse
Western Maryland	2[8]	1,750	Road switching	Electro-Motive

FREIGHT-CAR ORDERS

Road	No. of cars	Type of car	Builder
Atchison, Topeka & Santa Fe	1,000[9]	Gondolas	.....
	500[9]	Auto-box	.....
	300[9]	"DF" box	.....
	100[9]	95-ton ore	Company shops
	100[9]	Flat	Company shops
	50[9]	Air dump	Magor Car
Canadian National	1,000	50-ton box	Eastern Car
	500	50-ton box	Canadian Car & Fdry.
	200	70-ton gondola	Canadian Car & Fdry.
	250	50-ton box	National Steel Car
Canadian Pacific	200	70-ton gondola	Eastern Car
	40	70-ton covered hopper	Marine Industries
	200	70-ton hopper	National Steel Car
	500	50-ton box	National Steel Car
	200	70-ton flat	Canadian Car & Fdry.
	500	50-ton box	Canadian Car & Fdry.
Central of Georgia	500[10]	Box	Pullman-Standard
Chesapeake & Ohio	1,000[11]	70-ton hopper	Company shops
Chicago & North Western	1,575[12]	50-ton box	Pullman-Standard
	500[12]	Gondola	General American
Chicago Great Western	50[13]	70-ton covered hopper	ACF Industries
Chicago, Rock Island & Pacific	200[14]	50-ton box	ACF Industries
Fruit Growers Express Co.	400[15]	70-ton mechanical refrigerator	Company shops
Illinois Central	10[16]	70-ton covered hopper	General American
Kansas City Southern	75[17]	70-ton covered hopper	ACF Industries
Lehigh & New England	300	50-ton box	Pullman-Standard
Lehigh Valley	100[18]	Gondola	Bethlehem Steel
	100	50-ton box	ACF Industries
New York Central	3,000[19]	Box	Despatch Shops
Norfolk & Western	1,000[20]	70-ton hopper	ACF Industries
	500[20]	70-ton gondola	ACF Industries
Pennsylvania	1,200[21]	70-ton hopper	Bethlehem Steel
	800[21]	70-ton hopper	ACF Industries
	400[21]	70-ton hopper	Pullman-Standard
	1,000[21]	Box	Company shops
	500[21]	70-ton flat	Company shops
	100[21]	70-ton gondola	Company shops
Reading	700[22]	50-ton hopper	Bethlehem Steel
	150[22]	70-ton covered hopper	Bethlehem Steel
Rutland	100[23]	50-ton box	Pullman-Standard
St. Louis-San Francisco	1,350[24]	50-ton box	Pullman-Standard
	200[24]	70-ton covered hopper	Pullman-Standard
	200[24]	70-ton gondola	Pullman-Standard
St. Louis Southwestern	300[25]	50-ton box	Pullman-Standard
	100[25]	70-ton covered hopper	Pullman-Standard
	50[25]	Pulpwood rack	Company shops
Savannah & Atlanta	300[26]	Box	Pullman-Standard
Southern Pacific	200[27]	Box	Pullman-Standard
	750[27]	Box	Company shops
Union Tank Car Co.	450[28]	10,000-gal tank	Company shops
	320[28]	11,000-gal tank	Company shops
	20[28]	8,000-gal tank	Company shops
Western Pacific	300[29]	50-ton box	Pullman-Standard
Virginian	500[30]	55-ton hopper	Company shops

PASSENGER-CAR ORDERS

Road	No. of cars	Type of car	Builder
Canadian National	30[31]	50-ton refrigerator	Marine Industries
Chicago, Rock Island & Pacific	1[32]	RDC-1	Budd
Kansas City Southern	6[33]	Chair	ACF Industries

[1] Deliveries to be completed this year.
[2] Delivery of Electro-Motive units expected to begin around the first of next year; delivery of the Alco units, in October and November of this year.
[3] For delivery between October and December. Twenty-one of the 1,750-hp locomotives will be equipped with steam generators for possible use in passenger service.
[4] For assignment to the Camas Prairie. Estimated cost of 1,750-hp unit, $173,000; of the 1,200-hp unit, $110,000. Both units scheduled for December delivery.
[5] "Train Master" diesel unit. Cost $1,500,000.
[6] Unit delivered. Approximate cost, $85,000.
[7] Deliveries to begin this month.
[8] Approximate cost, $340,000. Delivery scheduled for this month.
[9] Purchases authorized by board of directors. Half the gondolas will be mill type with Nailable Steel flooring, and the other 500 will be the drop-bottom type. The automobile cars will have 15½-ft auxiliary doors and Nailable Steel flooring. One hundred of the "DF" cars will be insulated.
[10] Delivery of these 50-ft 9-ft-door cars expected in March 1956. Estimated cost, nearly $3.5 million.
[11] The cars—first big lot to be constructed new by the C&O in its company shops—will be built at an estimated rate of 10 a day, with the entire order scheduled for completion about the end of this year.
[12] Deliveries scheduled to begin in November.
[13] Estimated cost, $360,000. Delivery expected in January.
[14] Deliveries scheduled to begin in November.
[15] For delivery beginning in January 1956.

ORDERS AND INQUIRIES *(Continued from page 14)*

[10] Approximate unit cost, $12,100. Delivery expected this month.
[11] Estimated cost, $590,000.
[14] Building of gondolas to begin in November; of box cars, in January.
[18] Included in this order are 1,500 40½-ft cars with 8-ft doors, and 1,000 50½-ft cars, of which 500 will have to be 8-ft doors and the other half 15-ft doors. In addition, there will be 500 specially equipped 50½-ft damage-free cars, of which 200 will have 8-ft doors and 300 will have 15-ft doors. Deliveries are scheduled to begin in November and be completed next spring.
[20] Deliveries scheduled to begin early next year.
[21] The freight-car repair program of the Pennsylvania "has been materially accelerated." Cars are now being repaired at the rate of 175 cars a day.
[22] Approximate cost, $5,300,000.
[23] Approximate cost of these PS-1 box cars, $666,000. To be financed through a conditional sales contract. Deliveries scheduled for January.
[24] Purchase authorized by the Frisco's directors.
[25] The box cars, to cost an estimated $2,175,750, are scheduled for delivery through October; the covered hopper cars (estimated cost $877,800), are to be delivered in November; and the pulpwood cars (estimated cost $400,000), are expected to be delivered during November and December of this year.
[26] Delivery expected in March 1956. Estimated cost, $2 million.
[27] Cost, $8,250,000.
[28] Of the 10,000-gal cars, 250 are to be of aluminum. Deliveries scheduled for last quarter of 1955 and first quarter of 1956.
[29] To cost $2.5 million. Of the total group, 225 will be 50-ton 50-ft double door cars; 50 will be similar but equipped with automobile devices; and the remaining 25 will be equipped with fully adjustable damage-free loading equipment. Deliveries scheduled during September and October.
[30] Building of these cars to begin in second quarter of 1956.
[31] To be steel-sheathed overhead-iced express refrigerator cars. Delivery scheduled for completion this month.
[32] Delivered.
[33] Approximate cost, $850,000.

NOTES:

New York, New Haven & Hartford — The New Haven has announced its intention to purchase 10 1,200-hp. diesel-electric switching units for its New Haven-New York division.

Norfolk & Western — The N&W, is planning a new freight-car-building facility (see page 14), has estimated it will need 13,500 new 70-ton hopper cars and 1,100 new gondola cars in the next five years. During the same period, over 5,000 of the road's other freight cars will undergo heavy repairs.

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

Item No.		Month of May 1955	Month of May 1954	5 months ended with May 1955	5 months ended with May 1954
	FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)				
3	Road locomotive miles (000) (M-211):				
3-05	Total, steam	5,475	5,785	24,869	32,362
3-06	Total, Diesel-electric	35,962	33,167	171,497	157,486
3-07	Total, electric	788	670	3,606	3,252
3-04	Total, locomotive-miles	42,453	39,750	201,012	193,529
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,732	1,549	7,986	7,359
4-06	Empty, total	936	905	4,463	4,316
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	13,446	12,165	57,644	62,907
6-02	Total in oil-burning steam locomotive trains	1,874	1,990	7,116	10,683
6-03	Total in Diesel-electric locomotive trains	103,852	93,696	482,411	434,226
6-04	Total in electric locomotive trains	2,468	2,101	11,012	9,926
6-06	Total in all trains	122,443	110,432	561,716	519,336
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.03	1.02	1.02	1.02
10-02	Loaded freight car-miles	43.9	41.8	42.6	40.7
10-03	Empty freight car-miles	23.7	24.4	23.8	23.9
10-04	Total freight car-miles (excluding cabooses)	67.6	66.2	66.4	64.6
10-05	Gross ton-miles (excluding locomotive and tender) (000)	3,104	2,977	2,995	2,874
10-06	Net ton-miles (000)	1,415	1,318	1,344	1,265
12	Net ton-miles per loaded car-mile (M-211)	32.2	31.6	31.6	31.1
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car miles	64.9	63.1	64.2	63.0
14	Averages per train hour (M-211):				
14-01	Train miles	18.8	19.1	18.9	18.9
14-02	Gross ton-miles (excluding locomotive and tender (000)	57,600	56,203	56,095	53,876
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	47.9	43.1	45.7	41.8
14-02	All	45.1	40.6	42.9	39.7
15	Average net ton-miles per freight car-day (000) (M-240)	944	809	869	776
17	Per cent of home cars of total freight cars on the line (M-240)	45.5	54.0	49.2	54.3
	PASSENGER SERVICE (DATA FROM I.C.C. M-213)				
3	Road motive-power miles (000):				
3-05	Steam	1,439	2,196	6,989	12,318
3-06	Diesel-electric	20,268	21,066	100,682	103,126
3-07	Electric	1,294	1,385	6,658	7,043
3-04	Total	22,942	24,647	114,331	122,487
4	Passenger-train car-miles:				
4-08	Total in all locomotive-propelled trains	231,972	244,128	1,153,948	1,220,245
4-09	Total in coal-burning steam locomotive trains	8,013	10,381	40,088	62,723
4-10	Total in oil-burning steam locomotive trains	4,609	8,639	17,996	40,115
4-11	Total in Diesel-electric locomotive trains	204,824	209,940	1,019,286	1,038,581
12	Total car-miles per train-miles	9.70	9.54	9.71	9.59
	YARD SERVICE (DATA FROM I.C.C. M-215)				
1	Freight yard switching locomotive-hours (000):				
1-01	Steam, coal-burning	296,011	305,507	1,296,996	1,615,796
1-02	Steam, oil-burning	43,285	51,803	207,703	262,763
1-03	Diesel-electric[1]	3,606,244	3,268,292	17,265,779	16,202,520
1-06	Total	3,952,024	3,633,923	18,803,806	18,130,861
2	Passenger yard switching hours (000):				
2-01	Steam, coal-burning	8,250	12,130	47,194	65,869
2-02	Steam, oil-burning	5,428	4,256	24,752	21,477
2-03	Diesel-electric[1]	243,889	254,473	1,214,878	1,270,516
2-06	Total	283,567	297,225	1,415,047	1,492,287
3	Hours per yard locomotive-day:				
3-01	Steam	5.6	4.5	5.0	4.7
3-02	Diesel-electric	15.4	14.7	15.3	15.0
3-05	Serviceable	15.2	14.1	15.0	14.3
3-06	All locomotives (serviceable, unserviceable and stored)	13.4	12.0	13.1	12.3
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.58	1.63	1.63	1.71
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.76	.75	.76	.76

[1] Excludes B and trailing A units.

SUPPLY TRADE NOTES

GOULD-NATIONAL BATTERIES, INC.—*Richard Relf* has been named district manager, Cleveland area.

■

GARLOCK PACKING COMPANY.—*Walter A. Reynolds* has been appointed district manager at Denver, succeeding *M. J. Lester*, retired.

■

BALDWIN-LIMA-HAMILTON CORPORATION.—*E. H. Schoonmaker* has been appointed eastern district sales manager, with headquarters at New York. *W. A. McKnight* succeeds Mr. Schoonmaker as manager of Baldwin's sales office at St. Louis. Mr. McKnight was formerly located at Houston, Tex.

■

ALAN WOOD STEEL COMPANY.—*Perry L. Francis*, formerly vice-president in charge of sales, has been elected vice-president in charge of marketing.

■

NEW YORK AIR BRAKE COMPANY.—Ground has been broken in Kalamazoo, Mich., for a new plant to supplement present manufacturing facilities. The plant will be known as the Kalamazoo Division.

■

BARBER-COLMAN COMPANY.—The new Barber-Colman Park Plant, which houses the Uni-Flo Air Distribution Division, has been opened at Rockford, Ill.

■

NATIONAL MOTOR BEARING COMPANY.—The *Robert Mitchell Company*, Montreal, will serve as Canadian distributors for National Motor Bearing Company. Under arrangements completed between the two companies, the Mitchell company will handle not only Canadian distribution of NMB sealed circulating oil lubricating systems, but will eventually manufacture, in Canada, some component parts.

■

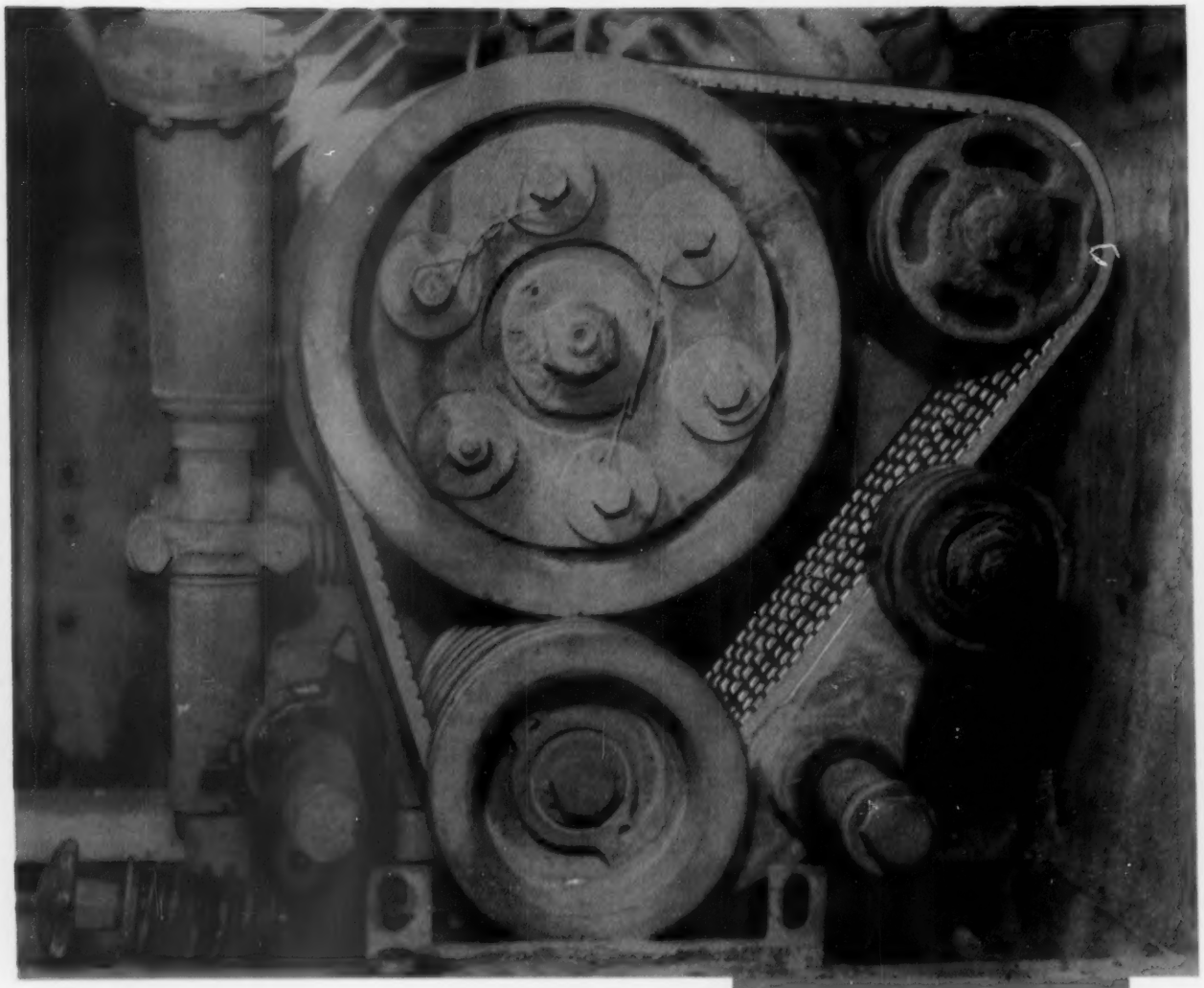
K. R. Ross

GENERAL ELECTRIC COMPANY.—*Kenneth R. Ross* has been appointed manager—transportation industries sales development, with headquarters at Schenectady, N.Y.

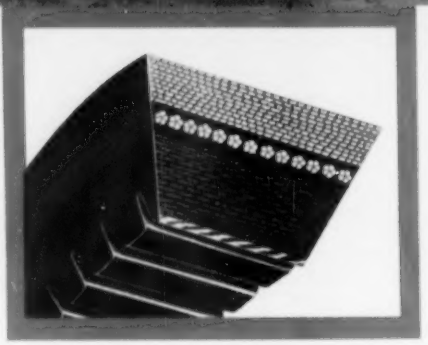
GE has opened an apparatus service shop

(Continued on page 22)

Dayton Cog-Belts* provide Service on Waukesha



Dayton Endless Cog-Belts, specially designed for the air conditioning unit shown here, are precision-made belts for precision-made equipment. They deliver 40% more H.P. because of their greater coefficient of friction. Maintaining positive speed, the Cogs give increased flexibility and resistance against squashing. The load-carrying section has minimum stretch because of a special cable twist synthetic cord. Requiring no lubrication or messy dressings of any kind, Dayton Endless Cog-Belts assure constant, dependable power at lower costs all year 'round.



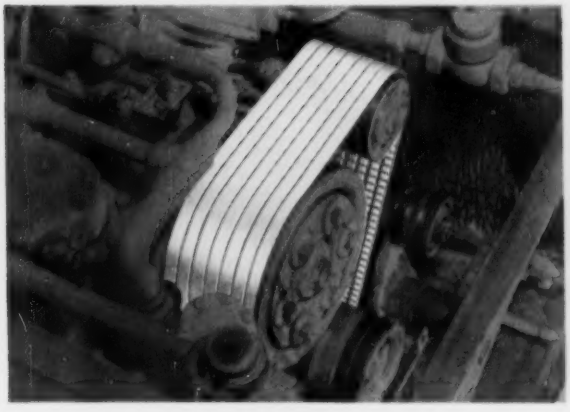
Multiple-Season drives

Major Railroads use Dayton Cog-Belts for Waukesha Service

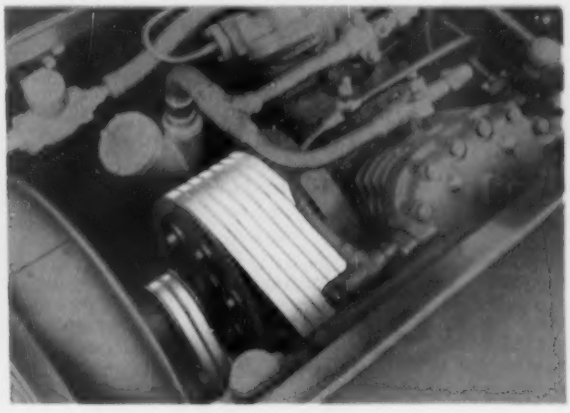
Serving its customers twenty-four hours a day, many months a year, Waukesha Air Conditioning keeps passengers cool and comfortable on America's Railways. For improved performance, rely on Dayton Endless Cog-Belts, the multi-season belts that deliver maximum power to Waukesha air conditioning units day in, day out, without interruption.

Dayton Endless Cog-Belts were specially developed for the Waukesha ice engine air conditioning units by Dayton Field Engineers, working hand-in-hand with Railway Electrical engineers. Tests quickly proved these harder-gripping, longer-lasting Dayton Endless Cog-Belts were the perfect answer to multi-season service, constant assured power, low-cost continuous performance. As a result, major railroads specify Dayton Endless Cog-Belts for their Waukesha equipment to get uninterrupted passenger air conditioned comfort at lower V-drive maintenance and replacement costs.

Investigate Dayton Endless Cog-Belts for your Waukesha V-drives. If you want these advantages, please consult with Dayton Railway Engineers. They'll be glad to help you solve your V-drive problems and improve present drive performance. Dayton Rubber Co., Railway Div., Dept. 206, Dayton 1, Ohio



With twenty-two years of specialized railway experience, it was easy for Dayton to develop the right V-Belts for this unit. Dayton Endless Cog-Belts provided the extra power, stamina and endurance that led to savings in time, labor and replacement costs.



Ten Dayton Endless Cog-Belts supply all the needed power on this Waukesha air conditioning unit. By employing seven Daytons on the compressor drive, two on the condenser drive and one on the fan belt drive, longer-lasting, low-cost service is assured.

GOLDEN JUBILEE

Dayton Rubber 50 YEARS OF PROGRESS

© D.R. 1955 *T.M.

World's Largest Manufacturer of V-Belts

Specialized Railway Representatives in New York, Chicago, Dayton, St. Louis, Atlanta, and San Francisco

SUPPLY TRADE NOTES *(Continued from page 19)*

at 2809 North Robertson street, New Orleans, La. *E. A. Woniger*, Atlanta service shop specialist, operates the new facility. Another apparatus service shop is being constructed in North Bergen, N.J.

■

ALUMINUM COMPANY OF AMERICA.—*Lewis P. Favorite* has been appointed manager of product sales, and *W. S. McChesney* manager of industry sales. Both are located at Pittsburgh. Mr. Favorite was formerly manager of the district sales office in New York.

■

SCULLIN STEEL COMPANY.—*Paul F. Gutmann, Jr.*, formerly assistant chief mechanical engineer, has been appointed chief mechanical engineer.

■

UNITED STATES RUBBER COMPANY.—*G. Allen Lovell* has been elected a vice-president and appointed general manager of the company's mechanical goods division. Mr. Lovell has been assistant general manager of the division.

■

PENNSYLVANIA SALT MANUFACTURING COMPANY.—Executive and operating division offices have been moved from the Widener building to Three Penn Center Plaza, Philadelphia.

■

RIDGE TOOL COMPANY.—*D. H. Rowe* has been appointed assistant sales manager.

■

GUSTIN-BACON MANUFACTURING COMPANY.—*Herb J. Smith*, formerly Kansas City district sales manager, has been appointed manager of the Railroad Sales Department, succeeding *George M. Seymour*, resigned. Mr. Smith will be located at 210 West 10th street, Kansas City.

■

E. W. Kettering

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION.—*E. W. Kettering* has been appointed to the new position of director of research. *B. B. Brownell*, assistant chief engineer, has been advanced to chief engineer.

■

W. H. MINER, INC.—*Edward H. Lehman* has been appointed to the newly created position of vice-president—mechanical; *Vernon S. Danielson*, chief draftsman, promoted to assistant to vice-president—mechanical, and *William D. Wallace*, mechanical engineer, appointed assistant to vice-president—engineering.

■

METAL & THERMIT CORPORATION.—A combined general office, research and distribution center, representing an investment of over $2,000,000, is expected to be completed in Rahway, N.J., in April 1956.

■

MILLER LUBRICATOR COMPANY.—*Willian G. Gray* has been appointed vice-president in charge of railway sales, with headquarters at 80 East Jackson boulevard, Chicago. Mr. Gray was previously manager of railroad sales for the Pyle National Company.

■

T-Z RAILWAY EQUIPMENT COMPANY.—*John Van Nort* has been appointed representative on the West Coast.

■

NATIONAL MALLEABLE & STEEL CASTINGS CO.—*Raymond E. Valentine*, sales manager, Railway division, at St. Louis, has been named assistant vice-president, sales, of the division, at Cleveland.

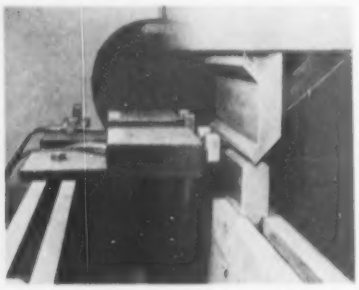
■

WHEELABRATOR CORPORATION.—*American Wheelabrator & Equipment Corp.* has changed its name to the Wheelabrator Corporation. The company's district sales office in Detroit has been moved to 13504 Fenkell avenue.

EQUIPMENT... *New Ideas—New Uses*

(Continued from page 10)

are inserted at both sides between the bottom control members and the column faces and are driven "home." The bolster is then lowered and positioned on the package. This ride stabilizer is available as a complete unit, or the component parts can be supplied. *The Holland Company, 332 S. Michigan avenue, Chicago.*



Magnetic Back Gauge

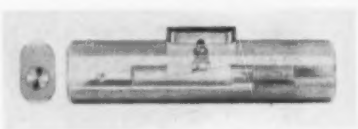
The AAC magnetic back gage it an attachment for press brakes, rolls and other metal forming machines. It is designed to correctly position work at all times. By doing this it is claimed that production is increased, mistakes and spoilage eliminated, and the danger of hand and finger injuries removed. Material fed to a machine with this gage is pulled into the proper position and held there while the ram is in motion, enabling the operator to keep his hands clear of the work. The operator does not have to feel to determine if the sheet is against the back stop.

The magnetic holding feature is energized only until the ram engages the metal. It then is released to allow full bending action during the forming operation. Accessory devices have been designed for specialized and automatic applications. *American Actuator Corporation, 219 East 44th street, New York 17.*

Portable Re-Fueler

The Briggs portable refueler is a two-wheel, lightweight unit that wheels freely over unpaved surfaces because of its wide surfaced wheels. Its 10 gpm self-priming hand pump is designed for one-man operation. The unit is intended to fuel equipment at the work site, avoiding long trips to distant fueling points. It can be used on a fuel truck or on the ground.

Th fuel drum arm is insered in an oil drum and takes its fuel well above the water and sludge level of the drum. The intake pipe is screened to prevent the entry of large particles. The oil is then passed through a full-flow filter which uses a disc-pac filter cartridge. *Briggs Filtration Company, River road, Washington 16, D. C.*



Adjustable Draw Key

With one easy wrench adjustment, Morse-taper tool shanks can be positively locked in machine spindles using the Davis adjustable draw key. All working parts of this draw key are precision-machined from tool steel. There are only three moving parts—the expanding wedge, plunger, and

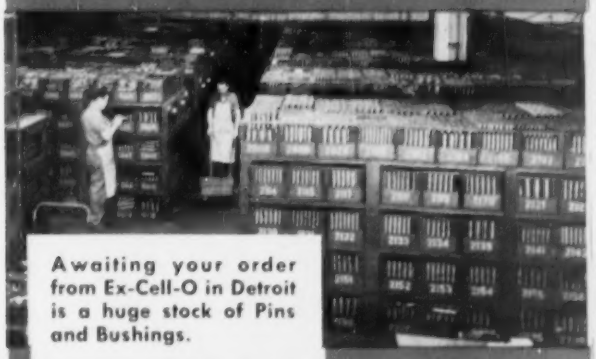
(Continued on page 112)

EX-CELL-O'S big inventory guarantees deliveries . . . So your inventory can be small

Today, railroad equipment is more uniform than ever before. To you who use Ex-Cell-O hardened and ground steel pins and bushings (more than 200 railroads and equipment builders do), this means

LOWER PRICES, whether you buy one or a thousand;
IMMEDIATE SHIPMENTS;
INVENTORY REDUCTION for you.

Keep on hand a catalog of Ex-Cell-O hardened and ground steel Pins and Bushings, for all types of motive power and car equipment. Write Ex-Cell-O today for as many copies as you'll need.



Awaiting your order from Ex-Cell-O in Detroit is a huge stock of Pins and Bushings.

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EX-CELL-O CORPORATION
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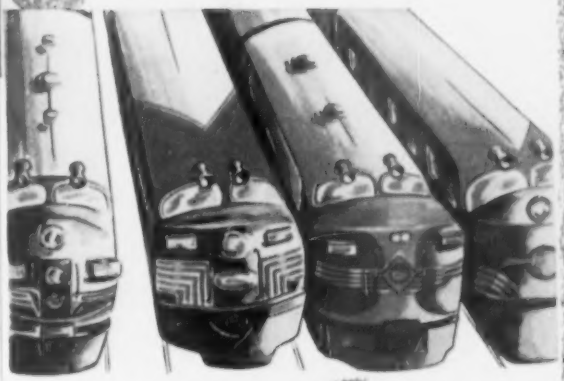
Right from the word go!



. . . There is a reason why most manufacturers of Diesels and rolling stock specify AMPLI-BOND for electrical connections in wire sizes from #8 to 4/0. It's because AMPLI-BOND Terminals and Connectors are designed to fill the specialized requirements for railway use. They are rugged enough to stand up under constant use and pre-insulated to eliminate wrapping, tape or spaghetti. The rough vinyl insulation is bonded to the terminal barrel; won't slip off or crack under crimping pressure. Hand Hydraulic and DYNA-CRIMP tools have positive crimping action to make fast, high tensile strength crimps.

Ampli-Bond

Terminals and Connectors and crimping tools for wire sizes #8 to 4/0.

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for Diesel Locomotives...
PROTECT AGAINST
WHEEL SPIN...

WHEEL SLIDE... WHEEL LOCK-UP

3 in 1

American Brake Shoe Controller

The 3 in 1 American Brake Shoe Controller, proven through years of service on diesel locomotives, provides the most complete and dependable protection.

The American Brake Shoe 3 in 1 Controller:

(1) Detects and corrects spin promptly at all speeds.
(2) Detects and corrects sliding during braking.
(3) Detects and warns if wheels become locked.
(4) Prevents rail burns.

WARNS ENGINEMAN EVEN WHEN POWER PLANT IS CUT OUT

SEE IT OPERATE IN BOOTH NO. 156

Allied Railway Supply Association Convention
Chicago, September 11-14

BRAKE SHOE AND CASTINGS DIVISION

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The MODERN Southern Pacific uses the MODERN Diesel lubricant

GULF DIESELMOTIVE OIL

104 YEARS AGO a small wood-burning locomotive forged the first link in what is now the gigantic Southern Pacific transportation system. Today powerful Diesels thunder over the maze of rails that make up this modern system which serves eight Western and Southwestern states.

Throughout the territory served by a subsidiary, the Texas and New Orleans Railroad, Southern Pacific Diesels are lubricated with Gulf Dieselmotive Oil. This modern Diesel lubricant contributes to better performance, greater availability, and lower maintenance costs on many of our nation's leading railroads.

here's why:

1. Effective detergent action prevents harmful piston ring belt deposits.
2. Base stocks are selected for their ability to help prevent hard deposits on the piston crown and in the ring belt area.
3. 100% solvent refining (removing undesirable constituents) insures greater stability and better bearing protection.

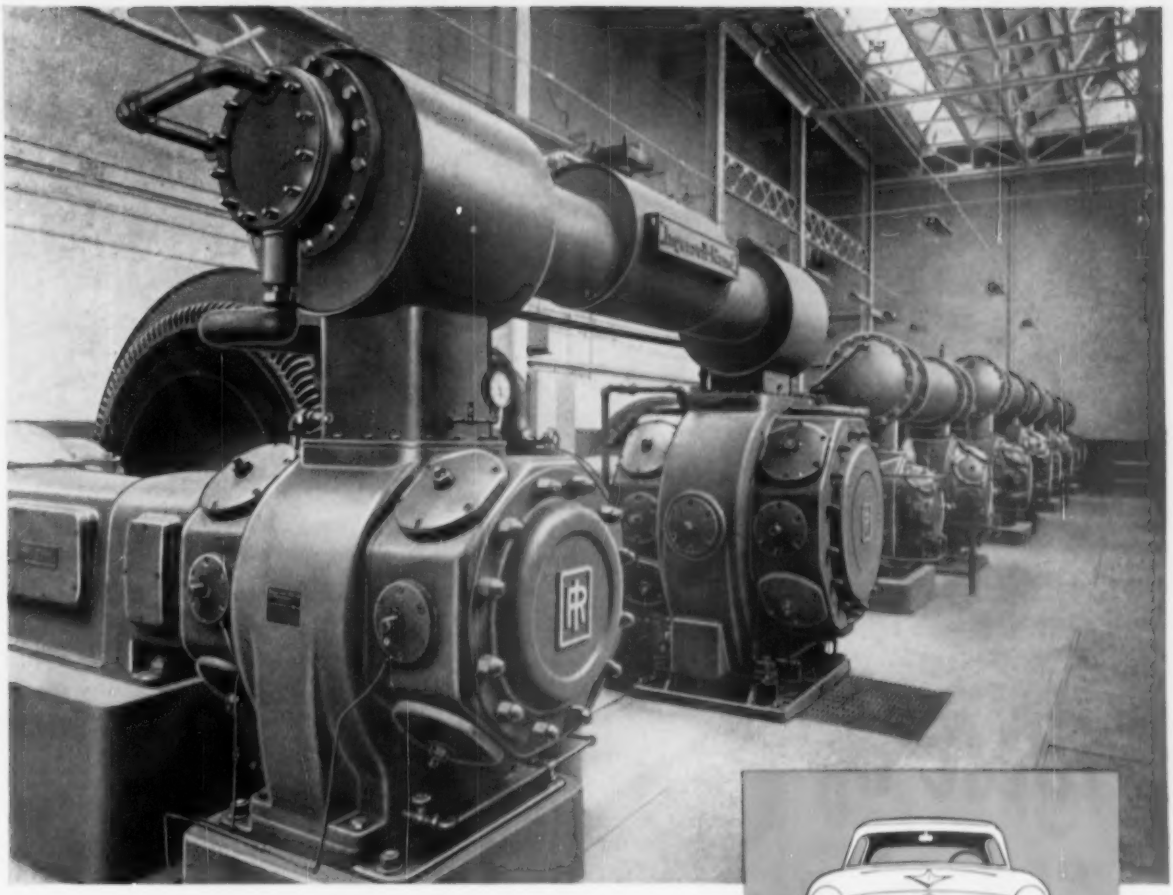
Gulf Sales Engineers, experienced in railroad Diesel operation, are always available to aid you in maintaining high standards of lubrication throughout your system. Consult the telephone directory for the number of your local Gulf office.

GULF OIL CORPORATION • GULF REFINING COMPANY

1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



Streamlined Air Power Plant

behind the streamlined NEW HUDSON

Modernized compressor room at Hudson Division of American Motors simplifies operation and maintenance

AT Hudson, improvement of plant and product go hand-in-hand.

Here, the compressed air plant previously consisted of one steam- and four electric-driven compressors, in three different locations. The old steam-driven unit, which had out-lived its value as a dependable standby, was replaced by a new Ingersoll-Rand 3,000 cfm PRE compressor. All five electric-driven compressors were then installed in a single building, with receivers and aftercoolers in the basement directly below. This compact installation is shown above, with the new PRE unit in the foreground. The four other compressors are also Ingersoll-Rand PRE units. Although more than 25 years old, they were found to be in such excellent running condition throughout that there was no need for replacement.

Wherever you need thoroughly dependable, low-cost air power, it pays to specify Ingersoll-Rand. Your I-R representative will be glad to show you why—and give you full details on any type of air or gas compressor. Helping you is his business!

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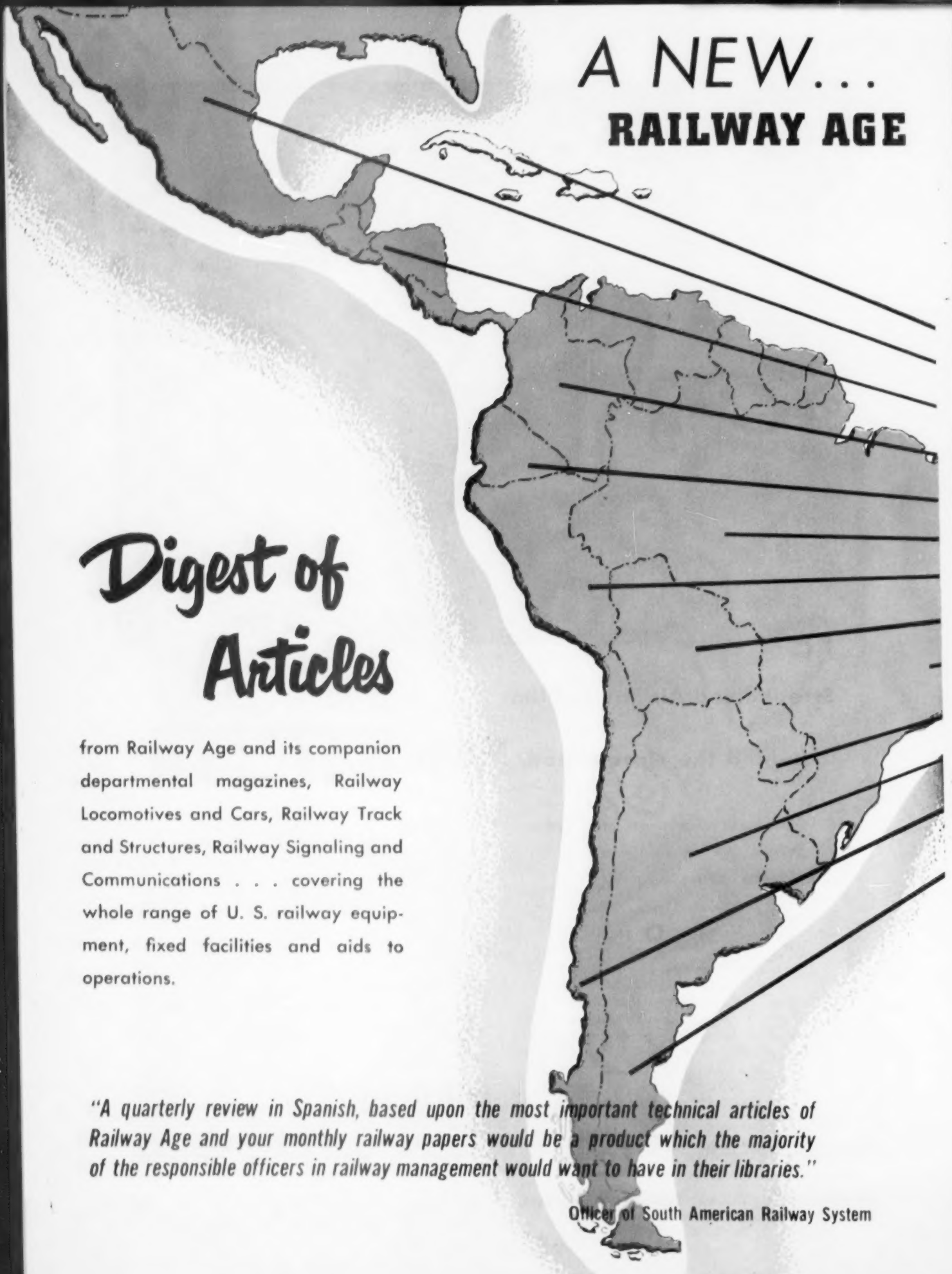
COMPRESSORS • CONDENSERS • AIR & ELECTRIC TOOLS • PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES



A NEW...
RAILWAY AGE

Digest of Articles

from Railway Age and its companion departmental magazines, Railway Locomotives and Cars, Railway Track and Structures, Railway Signaling and Communications . . . covering the whole range of U. S. railway equipment, fixed facilities and aids to operations.

"A quarterly review in Spanish, based upon the most important technical articles of Railway Age and your monthly railway papers would be a product which the majority of the responsible officers in railway management would want to have in their libraries."

Officer of South American Railway System

Publication in Spanish for

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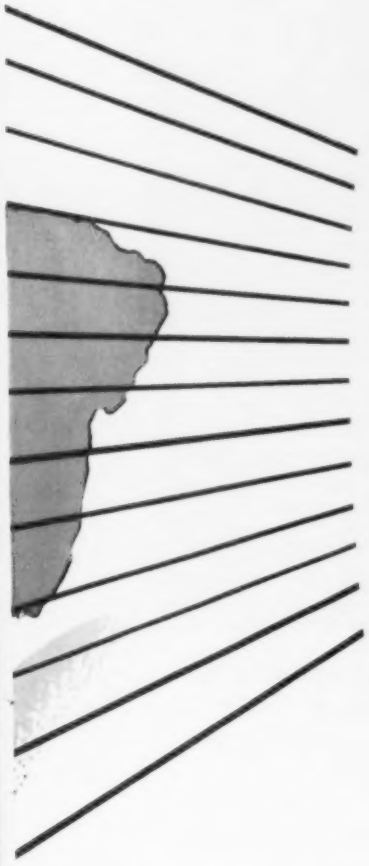

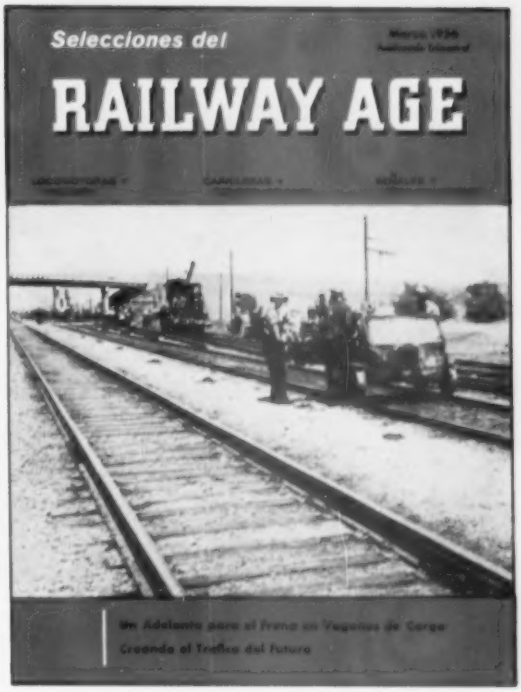

FIRST ISSUE

MARCH

1956

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Published Quarterly

Selecciones del Railway Age will provide a quarterly report in Spanish of North American railway developments in equipment and facilities for Latin American readers. All important news of locomotives, freight cars, passenger cars, shops, track and structures, signaling and communications, all kinds of devices and equipment for railway operations, accounting and record-keeping will be covered. Each of these many features will have a New Products Section to focus attention on the opportunities that U. S. products offer Latin American railways.

Emphasis editorially will be on how the U. S. railways are doing things and what they are adopting, buying, installing to improve their operations.

Selecciones del Railway Age will be a full-fledged 9" x 12" magazine with a comprehensive editorial content sectionalized and labeled throughout for easy use and reference. An important directory feature will be the listing of export sales offices of United States companies serving the Latin American market. From cover to cover it will be the type of magazine that will be kept, used and passed along for reference.

Selecciones del Railway Age will be diatributed among the executive and technical officers of the railroads in every country in Latin America, including the Spanish speaking islands of the Caribbean. The pledge of cooperation from railways below the border insures comprehensive distribution throughout Latin America.

Selecciones del RAILWAY AGE

A SIMMONS-BOARDMAN PUBLICATION

Time

. . . rides on your side with

Streamlite HAIRINSUL

LOW CONDUCTIVITY . . . Thoroughly washed and sterilized, all-hair heat barrier. Rated conductivity —.25 btu per square foot, per hour, per degree F., per inch thick.

LIGHT WEIGHT . . . Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by 40%.

PERMANENT . . . Does not disintegrate when wet, resists absorption. Will not shake down, is fire-resistant and odorless.

EASY TO INSTALL . . . Blankets may be applied to car wall in one piece, from sill to plate and from one side door to the other. Self-supporting in wall sections between fasteners.

COMPLETE RANGE . . . STREAMLITE HAIRINSUL is available ½" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings available.

HIGH SALVAGE VALUE . . . The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.

. . . because time has yet to destroy or impair the high insulating efficiency of *Streamlite* HAIRINSUL

Even after twenty or more years of service, STREAMLITE HAIRINSUL has been removed from refrigerator cars and re-used in new cars without need for further processing or renovating.

STREAMLITE HAIRINSUL, the all-hair insulation that actually weighs 40% less and gives so much more in efficiency and economy is a one-time investment.

At left are still more reasons why leading car builders demand STREAMLITE HAIRINSUL for efficient insulations. Write for complete data.

MERCHANDISE MART, CHICAGO 54

SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED

while in Chicago...

You're Invited to Visit the
Bullard Exhibit in Booth 1213
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SEVENTY FIFTH
1880 BULLARD 1955
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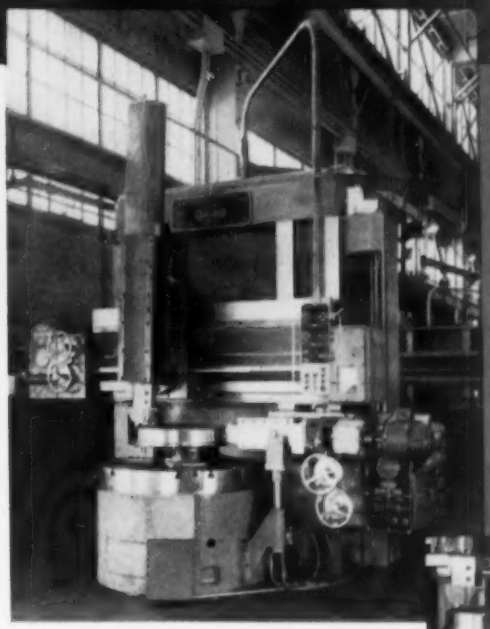

Here on public display, for the first time, you will see in action the most modern machine tools available to railroad shops. Remember — Railroads cannot be modern without modern . . . . Machine Tools!

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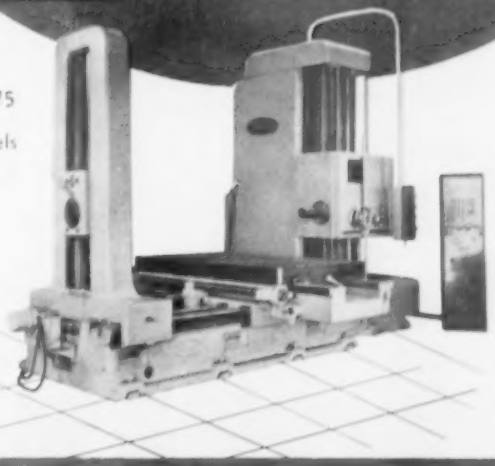
Model 75

Available in six sizes: 26" thru 76" in increments of 10".

HORIZONTAL BORING, MILLING AND DRILLING MACHINE Model 75

Available in three sizes: 3", 4" & 5" spindles in four models with various bed lengths, post heights and table sizes. Automatic positioning (optional).



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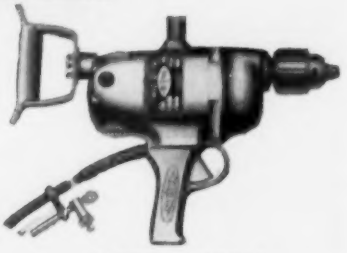
VALVE FACE GRINDING MACHINES

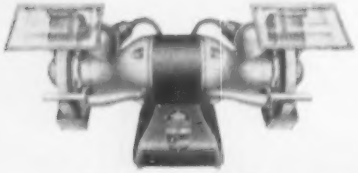
VALVE SEAT GRINDER SETS



ELECTRIC DRILLS

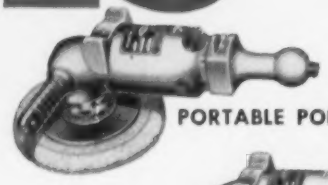
TOOLS

PORTABLE GRINDERS



BENCH GRINDERS

FLEXIBLE SHAFTS



PORTABLE POLISHERS

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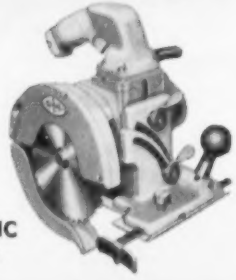
USE SIOUX ALL THE WAY THROUGH!

LAST

SEE YOUR SIOUX DISTRIBUTOR

ELECTRIC IMPACT WRENCHES



ELECTRIC SAWS

FLAT SANDERS

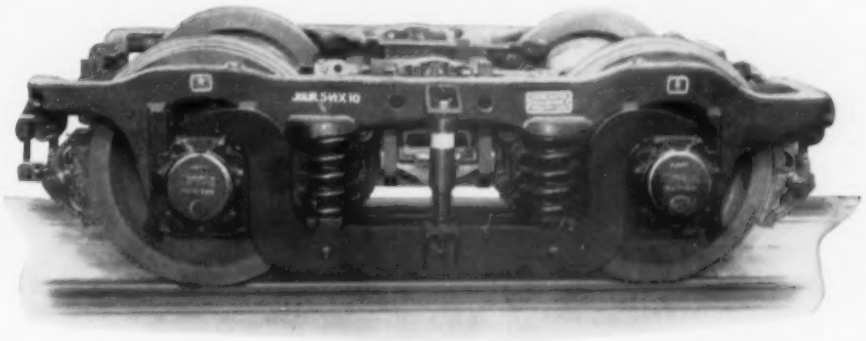
LONGER !

ALBERTSON AND COMPANY, INC. • Sioux City, Iowa, U.S.A.

The New Economical Way

to Replace Heavy, Worn-Out Baggage and Express Cars in Passenger Train Operation

Light weight head-end cars of modern design, such as the storage-mail express car illustrated above, equipped with COMMONWEALTH latest type BX Trucks, are the economical solution to the problem of replacing old, heavy weight equipment.



For operation at passenger train speeds, head-end commodity cars—express refrigerator cars—mechanically refrigerated cars—trailer carrying flat cars—all should be equipped with COMMONWEALTH BX type trucks to assure safe, smooth performance, to greatly reduce damage to lading and car, and for most economical operation.

When you consider replacing worn-out, heavy weight head-end cars, COMMONWEALTH BX type trucks offer outstanding advantages in economy and performance. Design includes equalization, swing-motion and one-piece cast steel truck frame with pedestals cast integral to insure perfect alignment of wheels and axles.

COMMONWEALTH BX Trucks are accepted in passenger train interchange without exception. Write today for full information!

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Locked-in efficiency for Southern Pacific Diesel #1356

J-M Gaskets provide lasting, positive seals

From long experience in serving America's leading railroads Johns-Manville has developed a broad line of packings and gaskets specially designed for Diesel locomotive service. They provide lasting positive seals against oil, steam or gas. They conform readily to warped or distorted surfaces.

J-M Gaskets are available in many types and styles

Materials include synthetic rubber, asbestos, metal-asbestos, solid metals and alloys. Your Johns-Manville Transportation Representative will be glad to talk with you about your gasket problems and suggest ways to get the most out of your gaskets or to help you select the most efficient and long-wearing gasket for your job.

For further information, write Johns-Manville, Box 60, New York 16, N. Y.

JM PRODUCTS

Johns-Manville

97 YEARS OF SERVICE TO TRANSPORTATION

Electrician wiring motorman's cab control station on new M. U. car with Simplex Car Wire.

285 Multiple-Unit Cars Equipped with Simplex Car Wire

Simplex Car Wire is used to wire air-conditioning units, lights, and control equipment in 285 new, multiple-unit, passenger cars for several railroads.

The rubber insulation on Simplex Car Wire won't lose physical and electrical properties when soaked in water or exposed to heat.

A smooth, tough, neoprene jacket on Simplex Car Wire resists abrasion, acids and oil.

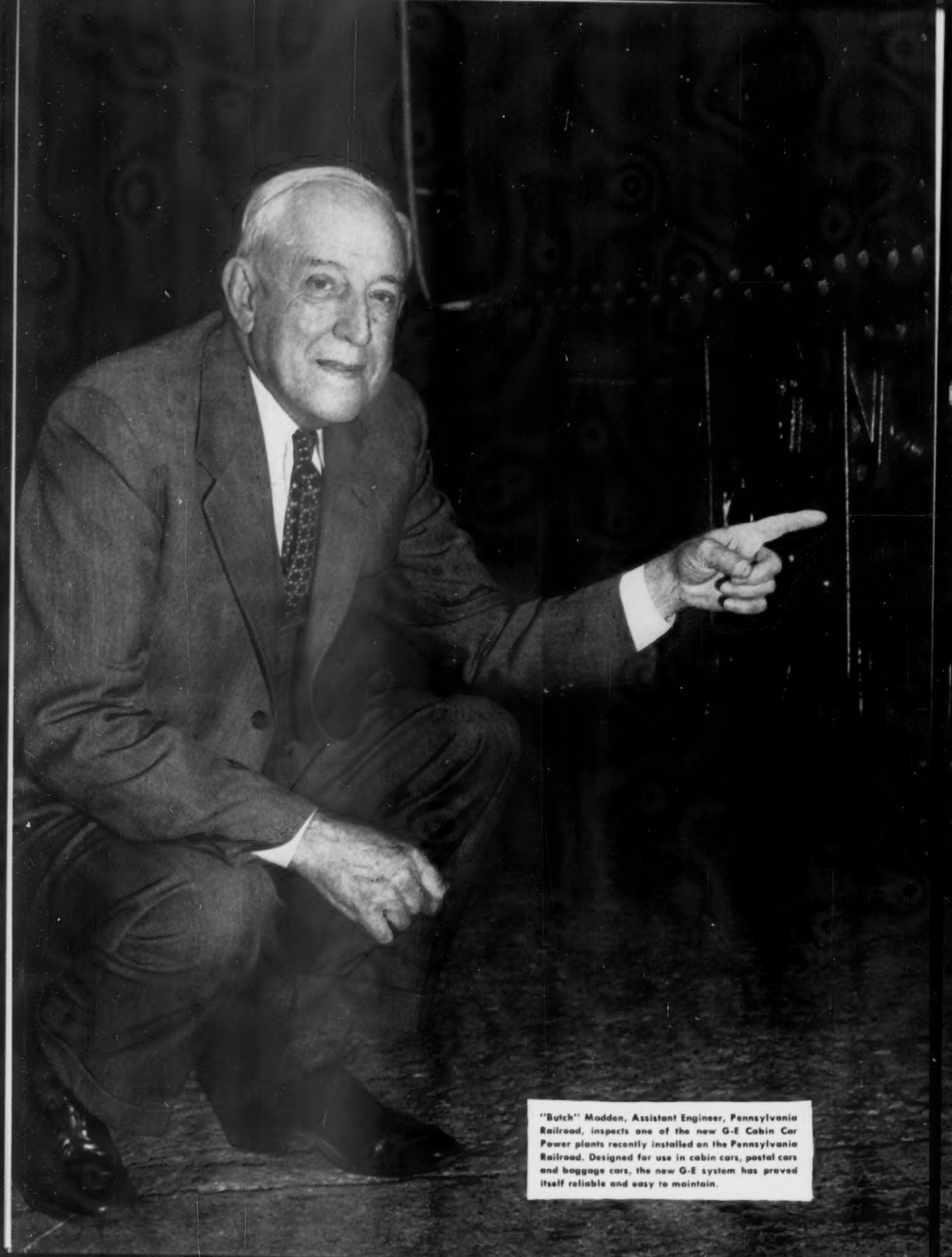
Simplex Car Wire strips readily for terminating. It's flexible and easy to handle.

It resists oxidation and withstands vibration.

Write the Railroad Department at the address below for more details about Simplex Car Wire.

Simplex CAR WIRE

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.



"Butch" Madden, Assistant Engineer, Pennsylvania Railroad, inspects one of the new G-E Cabin Car Power plants recently installed on the Pennsylvania Railroad. Designed for use in cabin cars, postal cars and baggage cars, the new G-E system has proved itself reliable and easy to maintain.

Pennsylvania Railroad Installs New G-E Cabin Car Power Supply

General Electric's new Cabin Car Power Supply is easier to maintain and is more reliable because:

1. It uses a simple rectified a-c system with an alternator designed specifically for railroad service.

2. The alternator is totally enclosed and completely protected.

3. G.E. has developed a highly simplified control system.

4. The alternator permits the use of standard, low maintenance gear drives.

5. The G-E Cabin Car Power Supply has ample reserve power to meet probable future demands.

Only General Electric has ***all*** these important features combined in an economical power supply for use in cabin cars, postal cars and baggage cars.

For more information, contact your G-E Apparatus Sales representative or write for bulletin GEA-5865A, General Electric Company, Locomotive and Car Equipment Department, Erie, Pa. 11568

Progress Is Our Most Important Product

GENERAL ELECTRIC

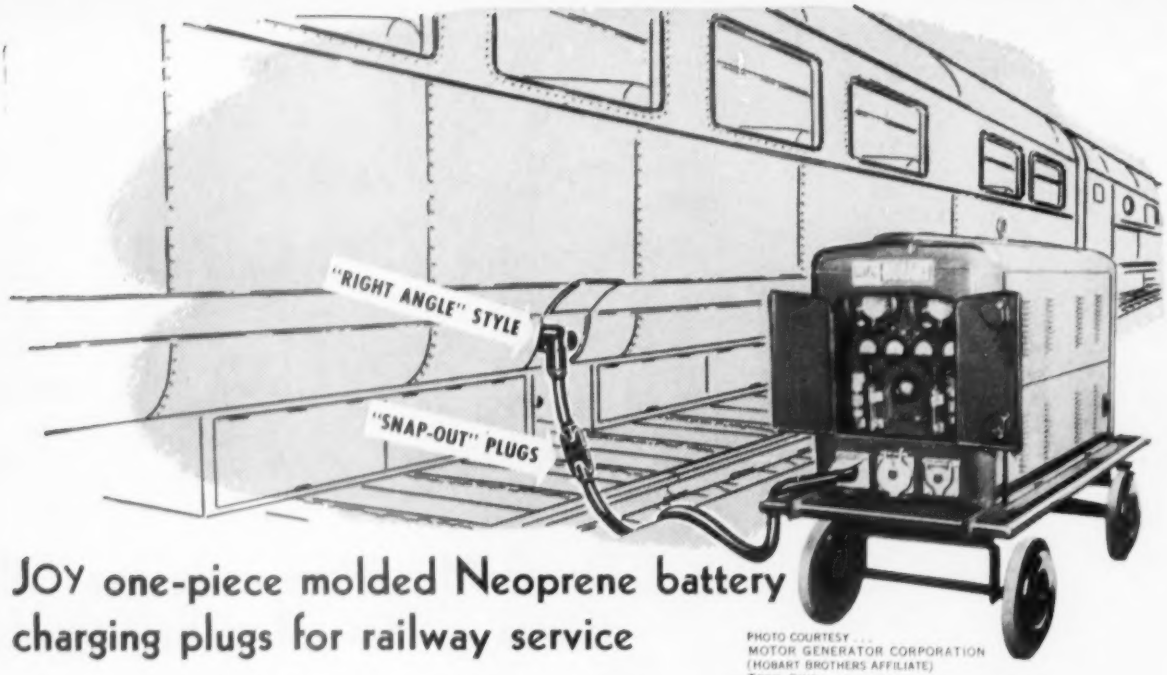


PHOTO COURTESY . . .
MOTOR GENERATOR CORPORATION
(HOBART BROTHERS AFFILIATE)
TROY, OHIO

JOY one-piece molded Neoprene battery charging plugs for railway service

Built to the blueprint of railway needs, JOY battery charging plugs are trim, one-piece Neoprene jacketed *units with replaceable contacts.* They will absorb relatively heavy blows without distorting and are practically immune to damage by oils, grease, acids, alkalies and moisture. Right Angle design (illus. above) furnished on a 21" length of cable with Male "Snap-out" plug on other end. Conventional design available in "molded-to-cable" or "attachable" styles as described below. JOY MANUFACTURING COMPANY, Oliver Building, Pittsburgh 22, Pa. *In Canada: Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.*

Attachable design . . .

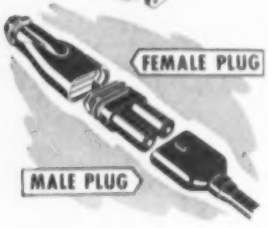
Can be quickly attached to or detached from cable without use of special tools. Connecting head has screw type wiring lugs. Neoprene sleeve automatically locks in position over cable/connector wiring junction through action of mating serrated lips inside sleeve and on O.D. of plug. Worm gear activated clamp insures snug fit between sleeve and cable. Contacts are replaceable.

Molded-to-cable design . . .

JOY *molded-to-cable style* plugs provide extra strength at vital cable/connector junctions. Furnished with 36" cable leads for splicing to power cable . . . however, also available factory vulcanized to cable lengths specified by customer, or as jumpers with male "Snap-out" connector on power connection end. Contacts are replaceable.

Mating Car Receptacles . . .

Choice of Swivel or Flush mounted aluminum housings. Both have spring loaded covers and replaceable Neoprene inserts. Furnished with 12" insulated pigtail wiring leads (other lengths available). Carefully manufactured to insure a long life of dependable service.



"Snap-out" Plugs . . .

Protect hard-to-replace battery charging equipment from unexpected train movement by providing a secondary connection approximately 21" below car receptacle that will disengage under a 20 to 25 lb. pull. Male plug (illus. at left) available only in *Molded-to-cable* design. Mating female plug, attaches to cable from power source, supplied in Molded-to-cable or Attachable designs.

***Yours for the asking . . .* Free literature on JOY railroad products!**

Available with **SNAP-OUT CABLE SECTIONALIZATION**

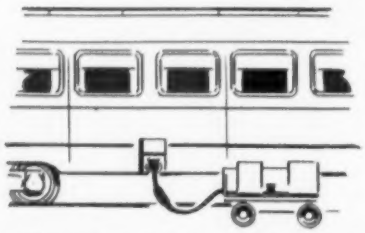
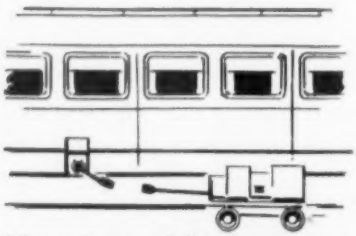


Illustration depicts standby power hook-up from motor generator unit



When train moves before disconnects are made . . . "Snap-out" plugs pull apart

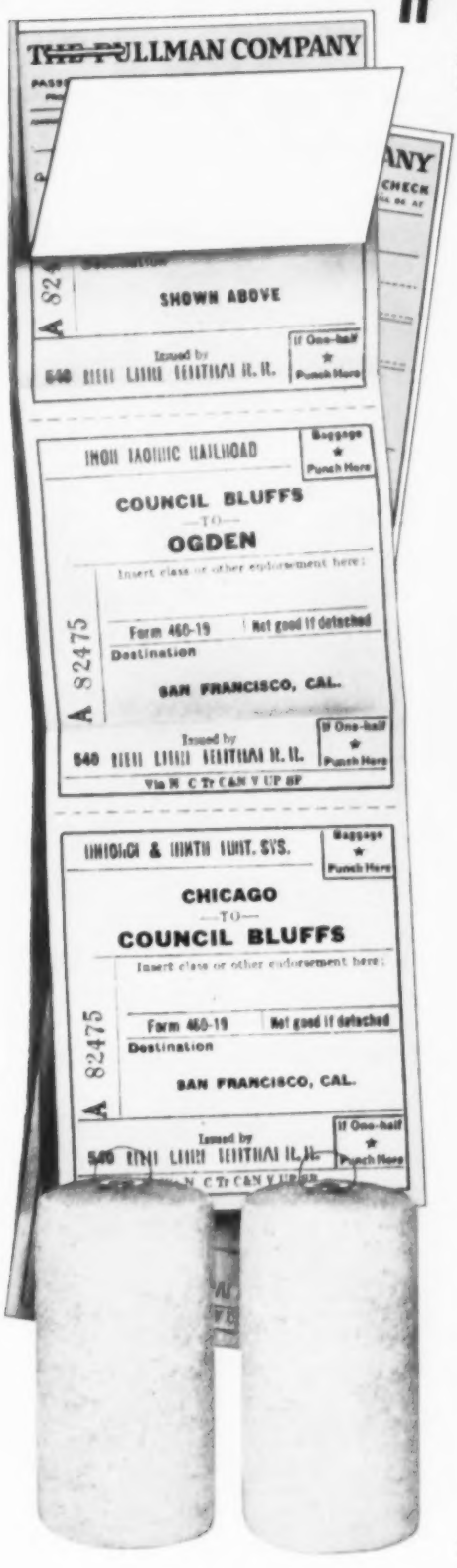
JOY

SINCE 1851 - OVER A HUNDRED YEARS OF ENGINEERING LEADERSHIP

CD 455-1

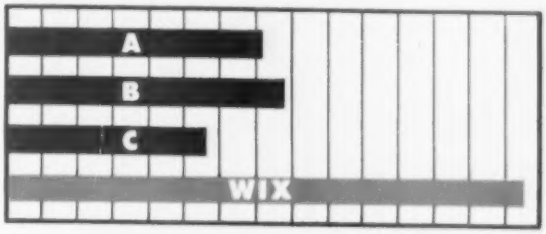
TICKETS and OIL FILTER CARTRIDGES

It Takes More Than a Quick Look to Tell How Far They'll Go!



A quick look at a railroad ticket may represent the difference between Portland, Ore., and Portland, Me. Judging Oil Filter Cartridges by appearances can be equally misleading—but here it's dollars instead of miles.

The value of an Oil Filter Cartridge lies hidden in such things as engineering, design, formula, craftsmanship and "know-how". WIX Engineered Filtration with electronic control of density and technical supervision of every step in construction pays off in PERFORMANCE.



A recent laboratory test of a WIX lube oil cartridge versus 3 other makes exposed this dramatic difference in performance.

Whether your problem is for fuel or lubricating oil filtration on yard, freight, passenger engines or maintenance-of-way equipment, you'll find the sound, economical, trouble-free answer in WIX Engineered Filtration.

Get the facts—write for catalog and full information today.

wix

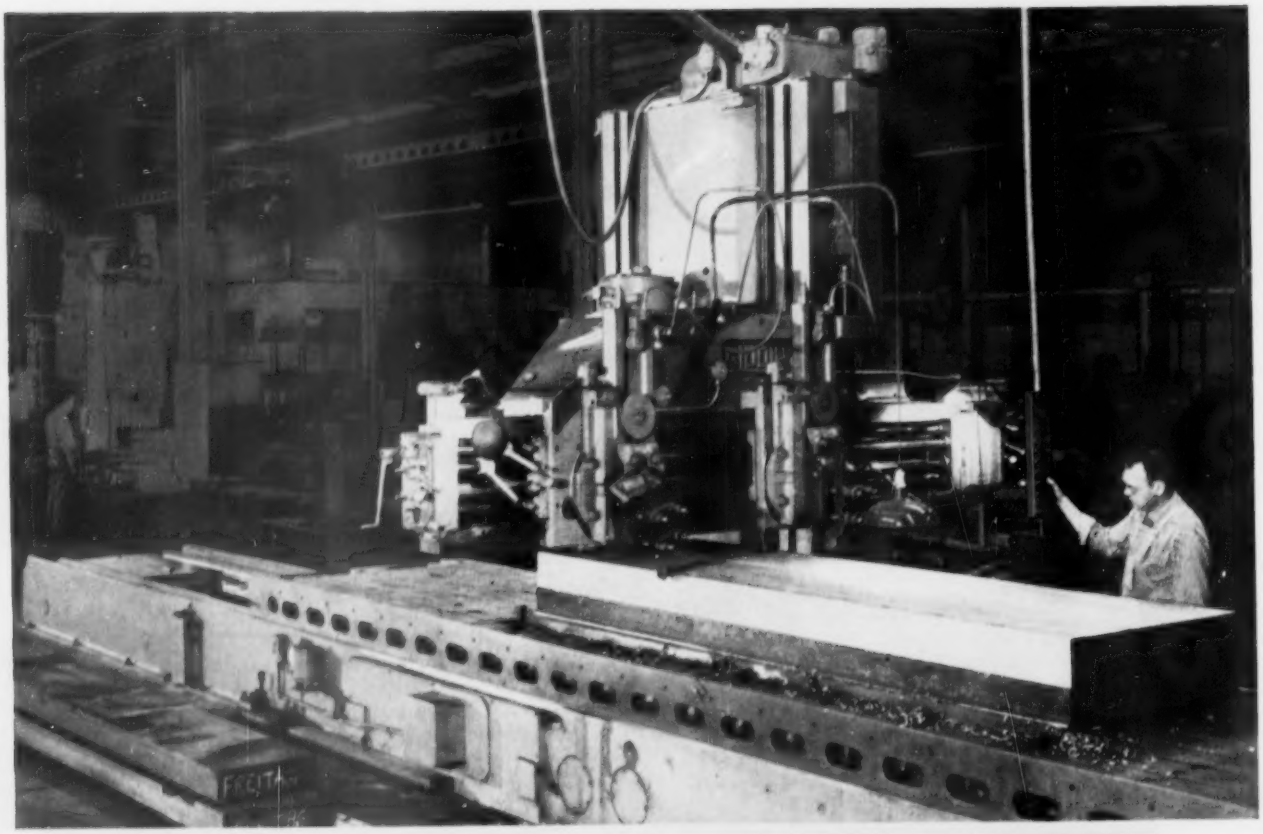
OIL FILTERS / CARTRIDGES

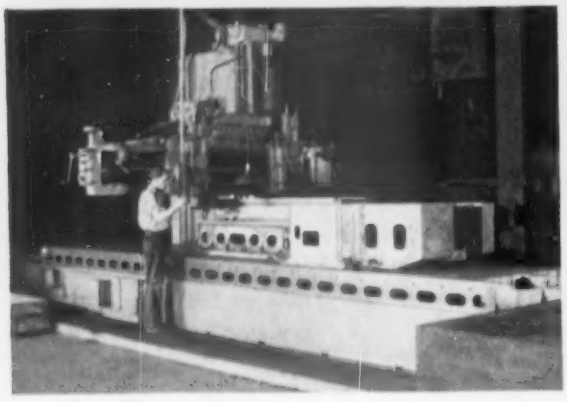
WIX CORPORATION · GASTONIA · N·C·

WAREHOUSES

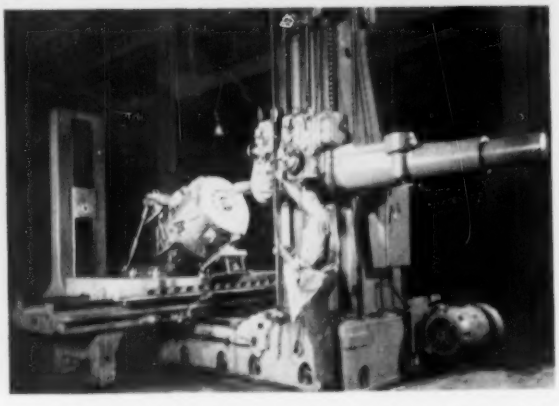
DES MOINES · GASTONIA · ST. LOUIS · NEW YORK · SACRAMENTO

Lower costs...
...higher quality





Here's a typical example of a large workpiece being planed on a Giddings & Lewis 62" x 60" x 24' Openside Planer. The planer's openside construction simplifies setup of unusually large workpiece that requires the full range of the machine. What's more, it holds tolerances within ten-thousands and provides greater flexibility of operations at high speeds.



This special mold for a die-cast engine part is precision-machined to close tolerances on Giddings & Lewis' Model 350-T Horizontal Boring, Drilling and Milling machine. The 350-T is equipped with extended saddle and saddle supports, also a micrometer measuring device which permits readings to .0001" of vertical travel of headstock and cross travel of machine table on the saddle.

quicker delivery parts with Giddings & Lewis Hypro Openside Planers and Model 350-T Horizontal Boring, Drilling and Milling Machines

—says report from R. H. Freitag Manufacturing Co.

MANUFACTURING plants everywhere depend on R. H. Freitag Mfg. Co. of Akron, Ohio to produce superior products to exact limits of precision at lower cost. Contributing to this outstanding ability are four Giddings & Lewis precision machines which provide the means to faster cutting, heavier cuts, better finishes and above all greater accuracy.

Extremely versatile, the G&L's are the busiest machines in Freitag's modern machine shop. They produce many intricate parts required in the manufacture of aircraft, automobiles, tools and dies, and components for other major industries.

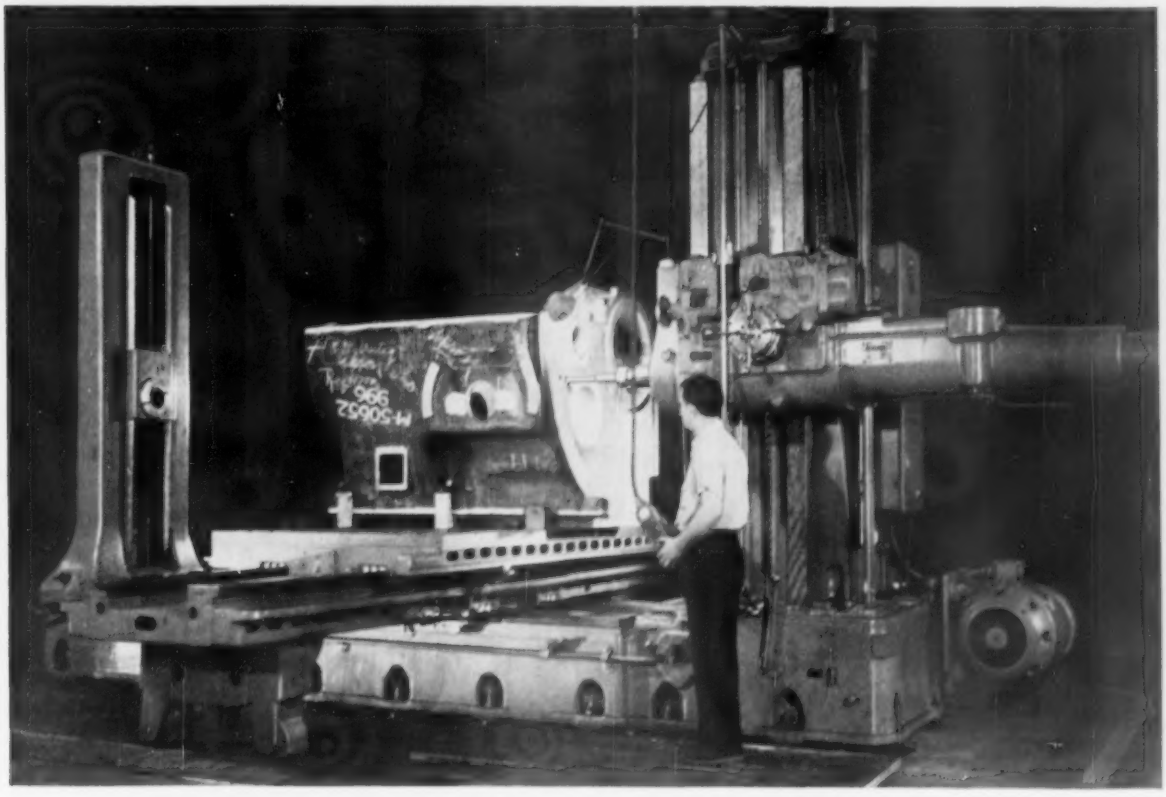
Two heavy-duty Model 350-T (Table type) Horizontal Boring, Drilling and Milling machines (5" dia. spindles) are equipped with extended saddle and saddle supports. They also feature an Automatic Electric Positioning Device which selects and controls the distances between machined holes. In addition, there are two G&L Hypro Openside Planers—a 48" x 48" x 32' machine and an extra heavy-duty 62" x 60" x 24'.

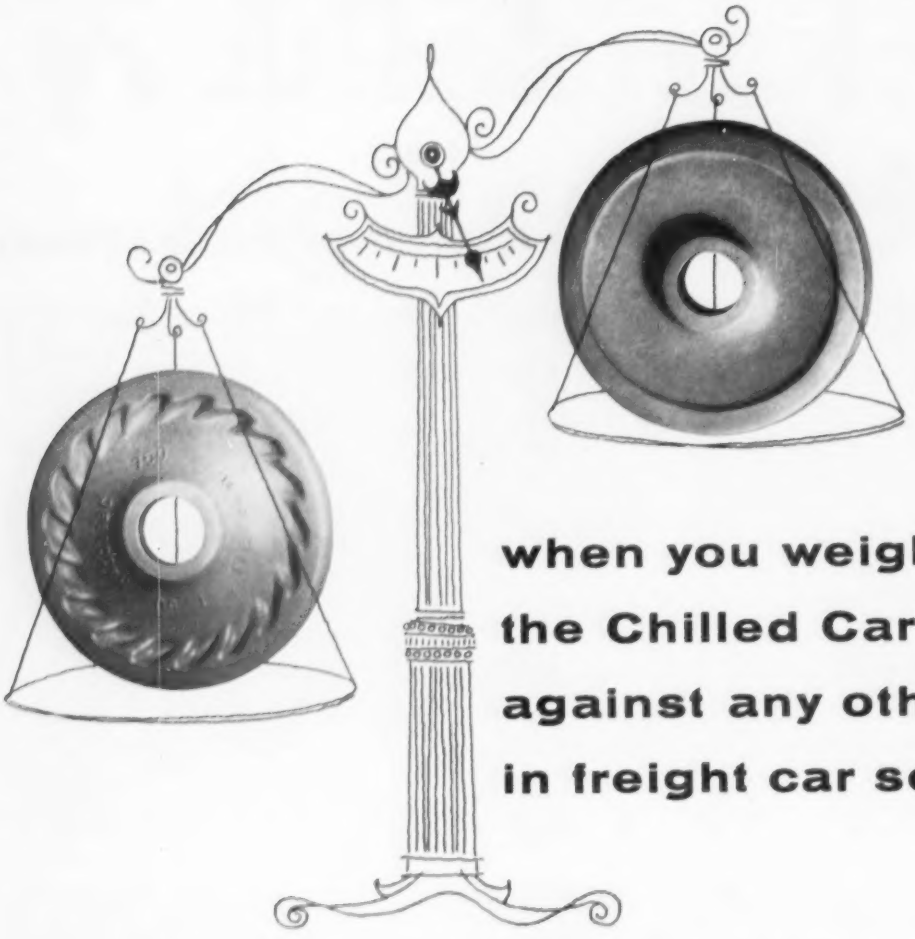
For more information on how machines like these can help you perform an exceptionally wide variety of operations, see your Giddings & Lewis representative, or write direct to factory.

GIDDINGS & LEWIS MACHINE TOOL CO.

FOND DU LAC, WISCONSIN

Builders of the world's finest heavy-duty Horizontal Boring, Drilling and Milling Machines—table, floor and planer types; Hypro Double Housing and Openside Planers, Planer Type Milling Machines and Vertical Boring Mills; and Davis Cutting tools.





when you weigh the Chilled Car Wheel against any other wheel in freight car service

give weight to the factors that count most with you

economy AMCCW chilled car wheels are low in first cost, high in exchange value, require little or no "foreign line" freight charges, permit smaller inventories.

performance AMCCW chilled car wheels have a better over-all safety record than any other wheel in freight car service, according to ICC records. The outstanding performance of the *new* AMCCW wheel has improved the chilled wheel safety record every year since it was introduced in 1950.

accessibility AMCCW chilled car wheels are made in 24 plants coast to coast; they are quickly accessible to every railroad.

Low first cost • Short-haul delivery • Reduced inventory • Available locally
Low exchange cost • Increased ton mileage • High safety standards
AMCCW plant inspection • Easier shop handling

Association of Manufacturers of Chilled Car Wheels

445 North Sacramento Boulevard, Chicago 12, Illinois

member companies:
Albany Car Wheel Co. • ACF Industries, Inc. • Marshall Car Wheel & Foundry Co. • Griffin Wheel Co. • Pullman-Standard Car Mfg. Co. • Southern Wheel (American Brake Shoe Co.)

NATIONAL CARBON COMPANY has always recognized the specialized nature of diesel-electric locomotive service. No other set of operating conditions in rotating equipment duplicates those of diesel-electric traction motors, generators and auxiliaries. That's why National Carbon was first with large-scale research and development work on brushes *specifically* formulated for railroad services.

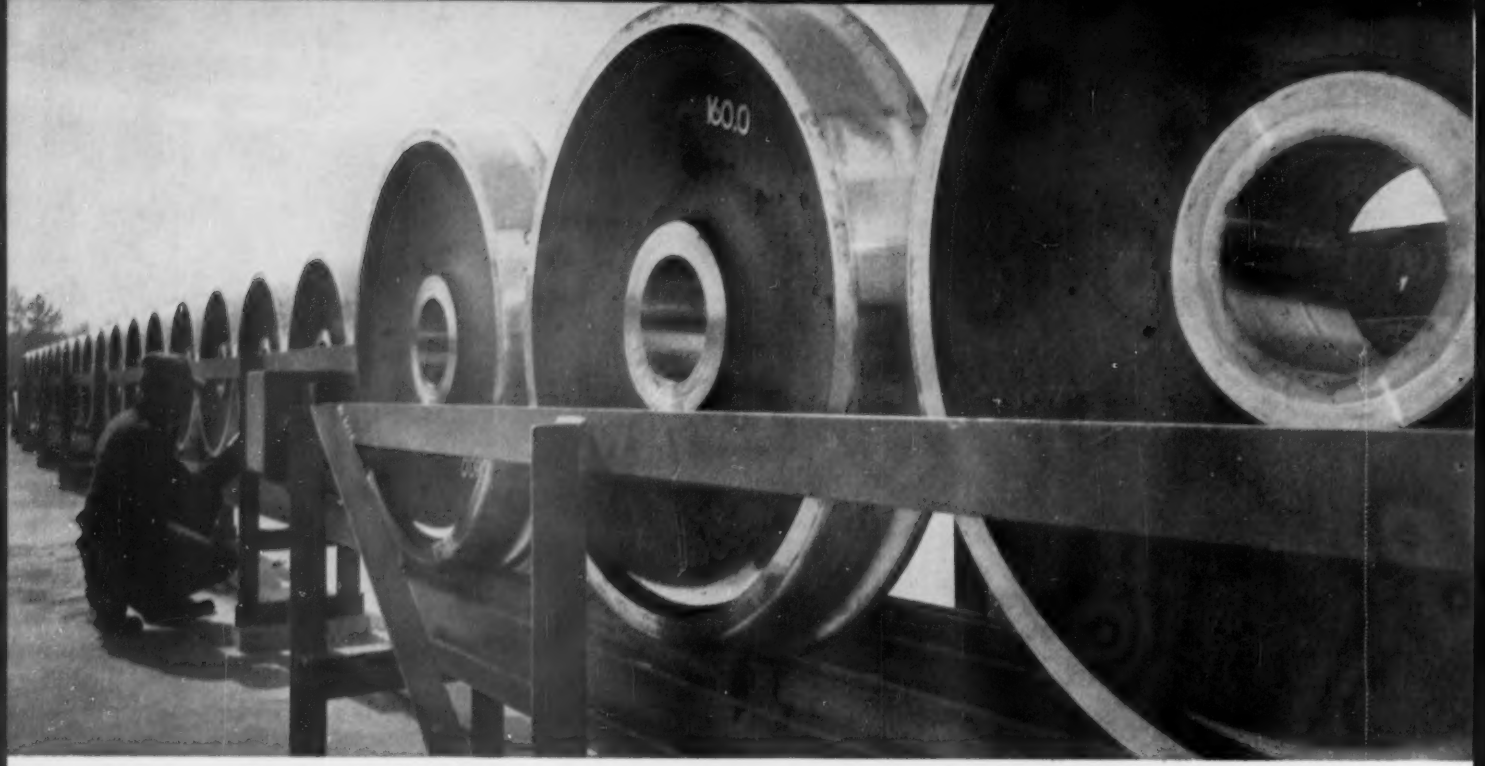
The railroads' interest in—and close cooperation with—this development program have paid handsome dividends—in ever-increasing miles per dollar spent for brushes and for commutator and other maintenance, as well as virtual elimination of mechanical brush failures.

No wonder far more "National" brushes are used in diesel-electric locomotive application than all other brands combined! Prove to yourself that you go *farther* with "National" brushes — for *less*.

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco
IN CANADA: Union Carbide Canada Limited, Toronto



New cast steel wheels roll by gravity to shipping platform at Southern Wheel's new Calera, Alabama plant.

HOW TO CUT STEEL WHEEL COST

Nation's most modern wheel plant shows the way!

Tomorrow's steel freight car wheel is a proven reality—*today*.

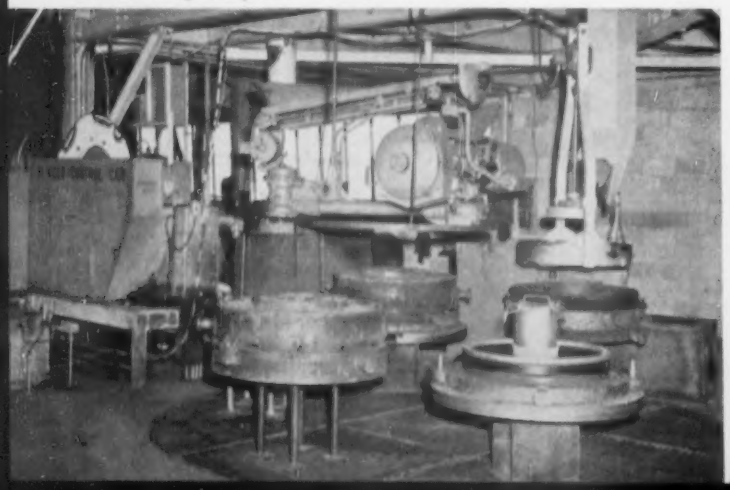
That wheel is the 1.5% carbon cast steel wheel—the Southern steel wheel that has been under development since 1941 and road tested since 1947 . . . rolling up more than 5½ million car miles, with many wheels already past the 200,000 mile mark.

This cast steel wheel was developed for one purpose only: to put the strength and stamina of steel in today's toughest freight service, at a cost representing decided savings over other steel wheels.

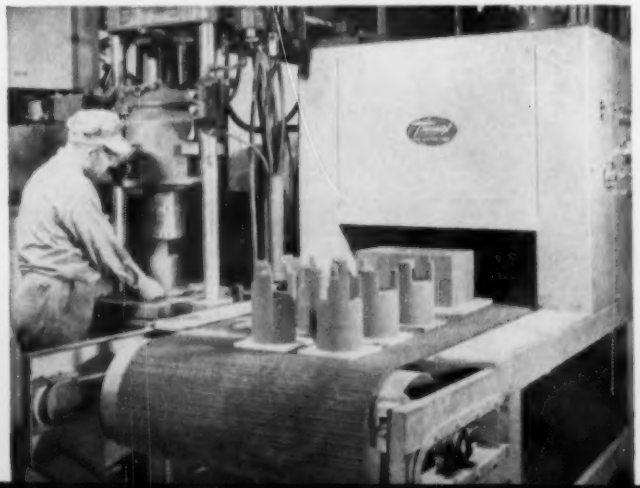
Only after years of research, after years of road test—when we were convinced we had the *right* wheel—did we begin commercial production. From our many years of wheel making experience we designed, built and equipped a brand new plant to make nothing else but this new steel wheel. Here you see some of the modern manufacturing facilities that make possible such high quality freight car wheels at such low cost.

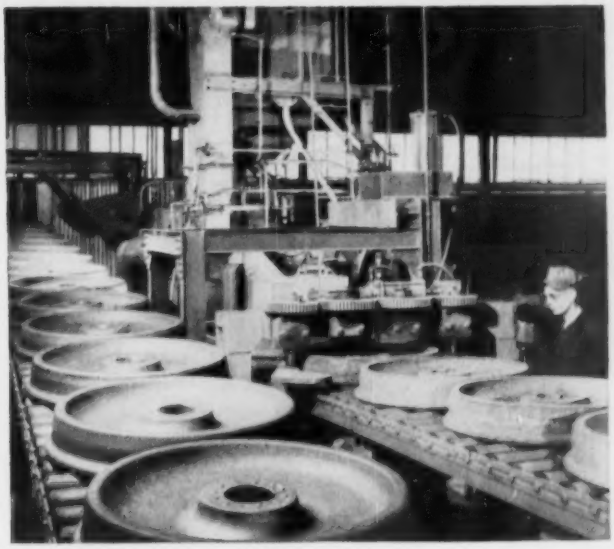
If you would like to learn more about these service-proven wheels, ask your Southern Wheel representative for the new 36-page illustrated booklet, "The First Five Million Miles." Or write American Brake Shoe Company, Southern Wheel Division, 230 Park Avenue, New York 17, New York (Member of AMCCW).

Powerful sand slinger fills and rams molds. Modern equipment helps cut costs throughout production areas.

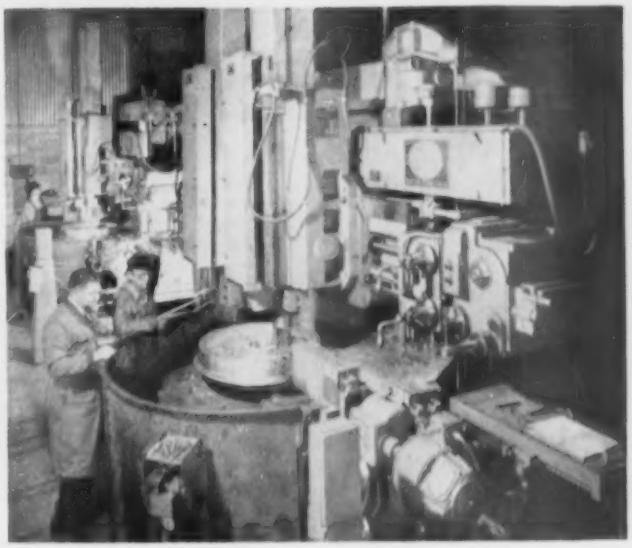


Cores are pneumatically molded and then baked in dielectric ovens. The rectangular object is a test sample mold for quality control.





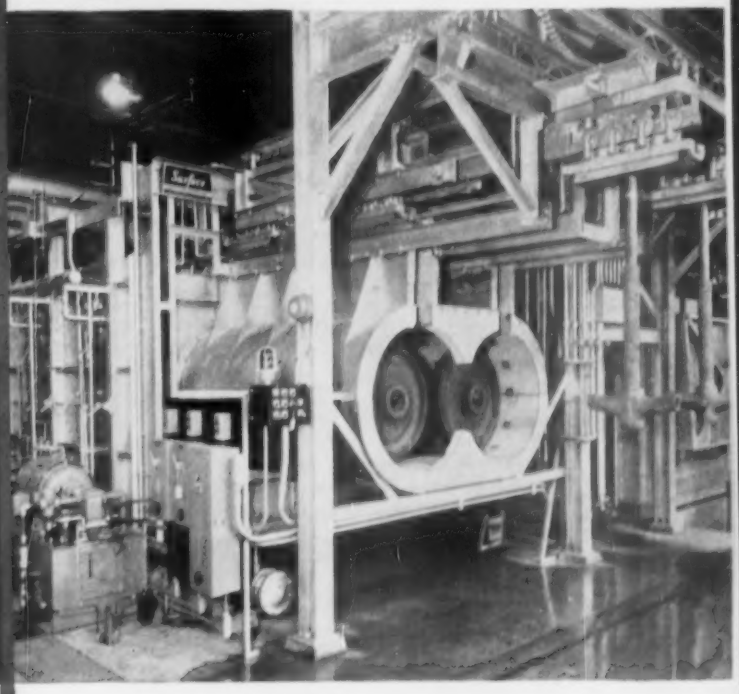
Latest type shot blast cleans wheels of heat treat scale. From pouring to final inspection, wheels travel by conveyor.



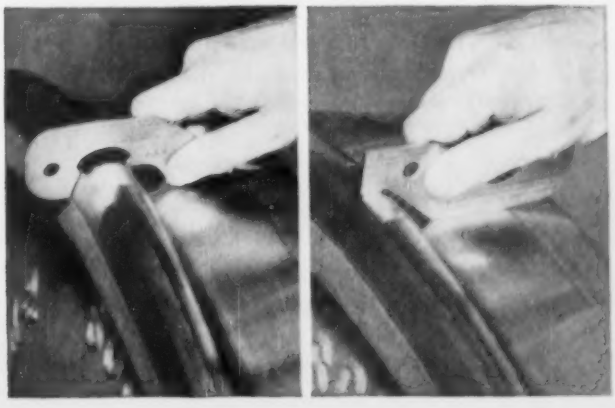
Automatic machining of tread, flange and hub is done at one chucking on a battery of four vertical turret lathes.

Pushbuttons control shakeout. This equipment separates wheel castings from molding flasks.

Two-stage heat treatment occurs in electronically controlled continuous furnaces.



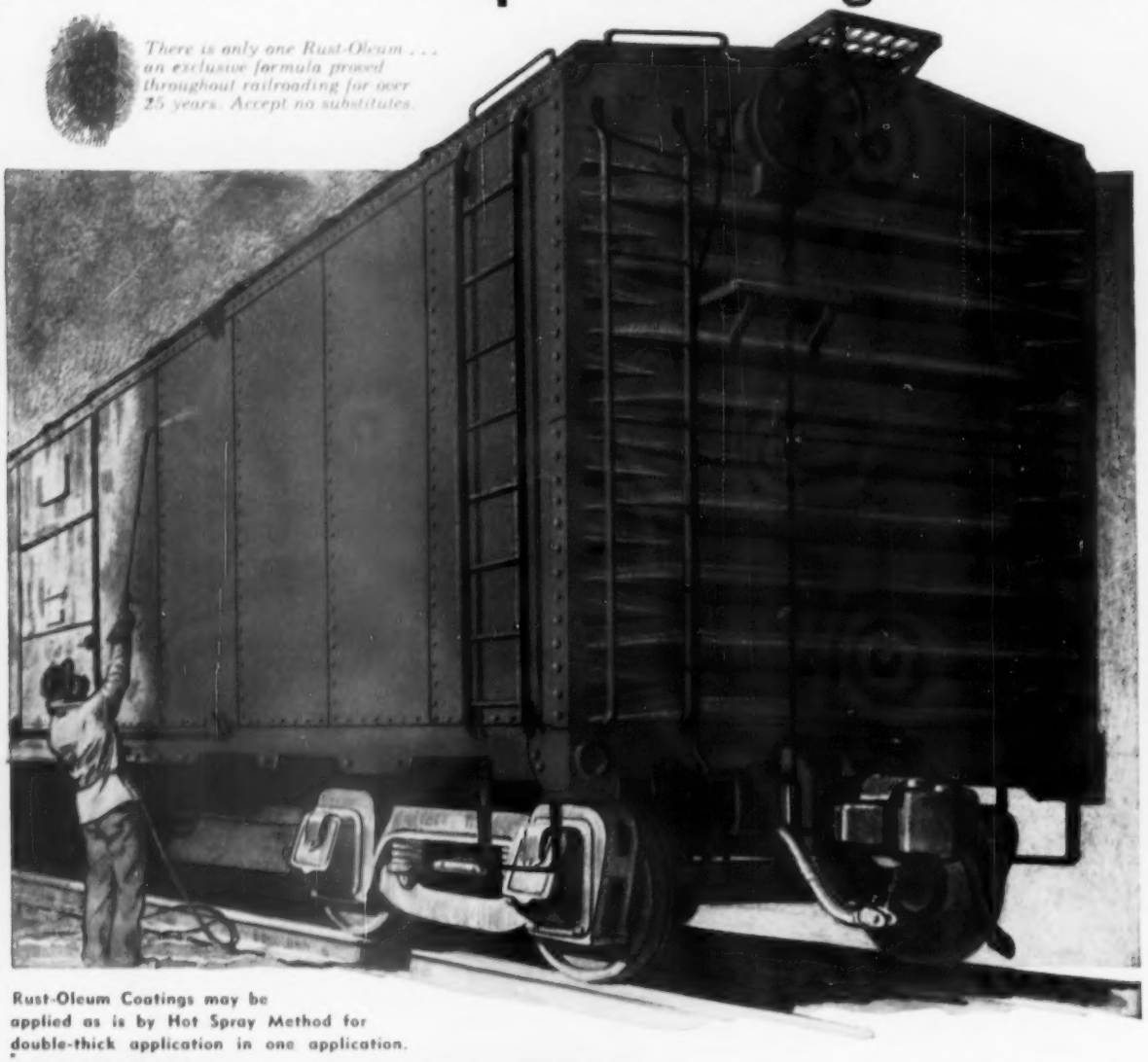
Standard gages for flange height and thickness are used with Southern steel wheels.



Standard mounting tolerances apply to finish boring of Southern cast steel wheels.

RUST-OLEUM keeps 'em looking like this!

There is only one Rust-Oleum . . . an exclusive formula proved throughout railroading for over 25 years. Accept no substitutes.



Rust-Oleum Coatings may be applied as is by Hot Spray Method for double-thick application in one application.

RUST-OLEUM®

STOPS RUST!

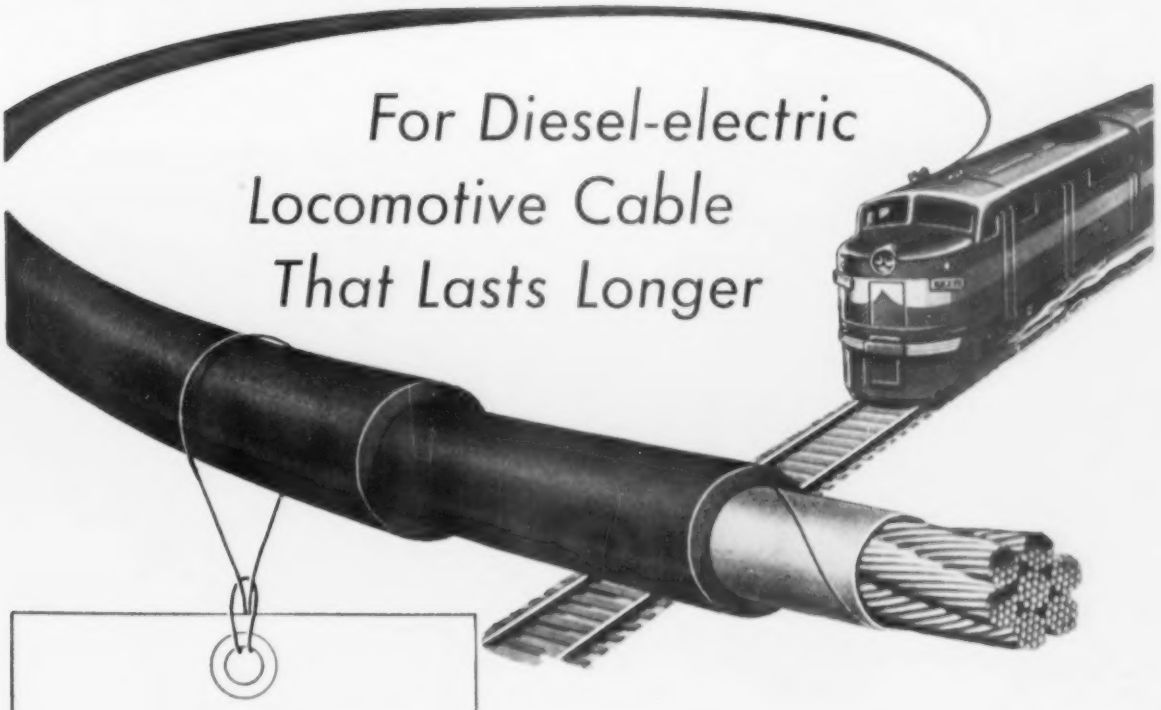
Protect *new* metal surfaces . . . save even *badly rusted metal!*—and cut maintenance costs, too. Simply scrape and wirebrush to remove rust scale and loose particles . . . then brush Rust-Oleum 769 Damp-Proof Red Primer directly over the *sound rusted surface*. Sandblasting, chemical pre-cleaning and other costly preparations are *not* usually required. You save time, money, and metal on bridges, rolling stock, signal equipment, tanks, buildings, towers, etc. See how Rust-Oleum can save you money . . . why major railroads all over the country rely upon Rust-Oleum. Get the *complete* story from a Rust-Oleum Railroad Rust Preventive Specialist!

RUST-OLEUM CORPORATION

2593 Oakton Street, Evanston, Illinois

Write for your copy of the new Rust-Oleum Catalog, *today!* Available in many colors, aluminum, and white.

For Diesel-electric Locomotive Cable That Lasts Longer



G-E VERSATOL GEOPRENE resists—

- FLYING GRIT AND SAND
- OIL
- WATER
- CLEANING COMPOUNDS
- LIVE STEAM
- ICE DAMAGE

G-E Versatol* Geoprene* cable has a neoprene-base jacket that resists flying dust, grit, and sand. It withstands oil, water, cleaning compounds, live steam, and ice. The extra-flexible rope stranding is designed to stand up under continuous flexing.

Fine stranding makes this cable extremely easy to handle and to pull through conduit. Insulation strips cleanly. The carefully controlled diameter and concentricity of the cable provide a proper fit at all bushings and terminals.

G-E Versatol Geoprene cable is immediately available from stock in sizes No. 14 Awg and larger for power circuits (1000-volt rating); in sizes No. 16 and 14 Awg for control circuits (300-volt rating); and for general-purpose wiring. Control cable has rating printed on the surface for easy identification.

*Registered Trade-mark General Electric Company

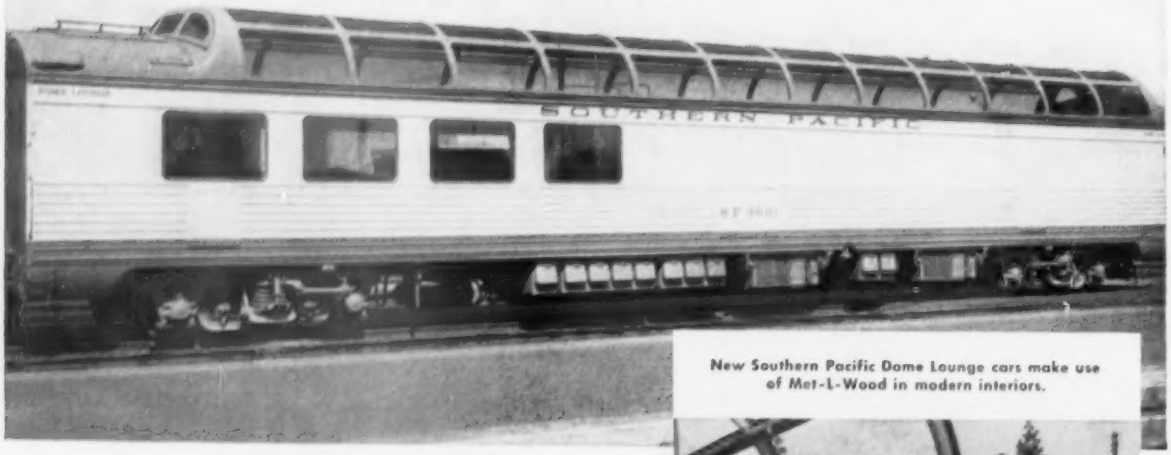
Technical Information available

Special high-temperature G-E cables are available for use in high-heat areas. For complete information, general purpose or special application, write for specification booklet "G-E Diesel-electric Locomotive Cables." Section W159-947, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For MODERN PASSENGER CARS:



New Southern Pacific Dome Lounge cars make use of Met-L-Wood in modern interiors.

Original Beauty

in Panels
Partitions
Wainscoating
Doors
of

MET-L-WOOD

METAL BONDED TO PLYWOOD

Your designers have a wide choice of beautiful modern passenger car interiors when Met-L-Wood is the building material . . . Smooth, tough panels and doors, finished in steel, stainless, aluminum, Formica or Decorative Vinyls permit original beauty of design, plus these *practical* operating advantages of Met-L-Wood:

Fast Assembly	**Sound Deadening**
Light Weight	**Vibration Damping**
Insulating	**Lowest Maintenance**

Bulletins 520 and 521 give detailed data on Met-L-Wood doors and panels for passenger car interiors. Write for your free copies today.

MET-L-WOOD

CORPORATION

6755 W. 65TH ST • CHICAGO 38, ILL

FORMICA

PLASTIC-FACED
MET-L-WOOD

Met-L-Wood is the exclusive distributor of Formica products in the transportation industry. Now, you can use the many distinctive Formica designs—and excellent wearing qualities—bonded to Met-L-Wood panels and doors for unsurpassed beauty and utility in passenger car interiors. Full details on Formica-faced Met-L-Wood will be sent promptly on request . . . and don't forget Formica superiority for table, counter and washstand tops!

Announcing

NEW HOLLAND

RIDE STABILIZER

PACKAGE

you are invited to see these HOLLAND spring units on display in booths 102, 103, 132 and 133 coordinated mechanical assn. convention sept. 12, 13 and 14—hotel sherman—chicago

1⅛"

2½"

HOLLAND
Volute Snubber Springs, Either 1⅛" or 2½" Spring Travel

STYLE A-7-A
Volute Snubber Spring, 1⅛" Travel—in 40-Ton Group

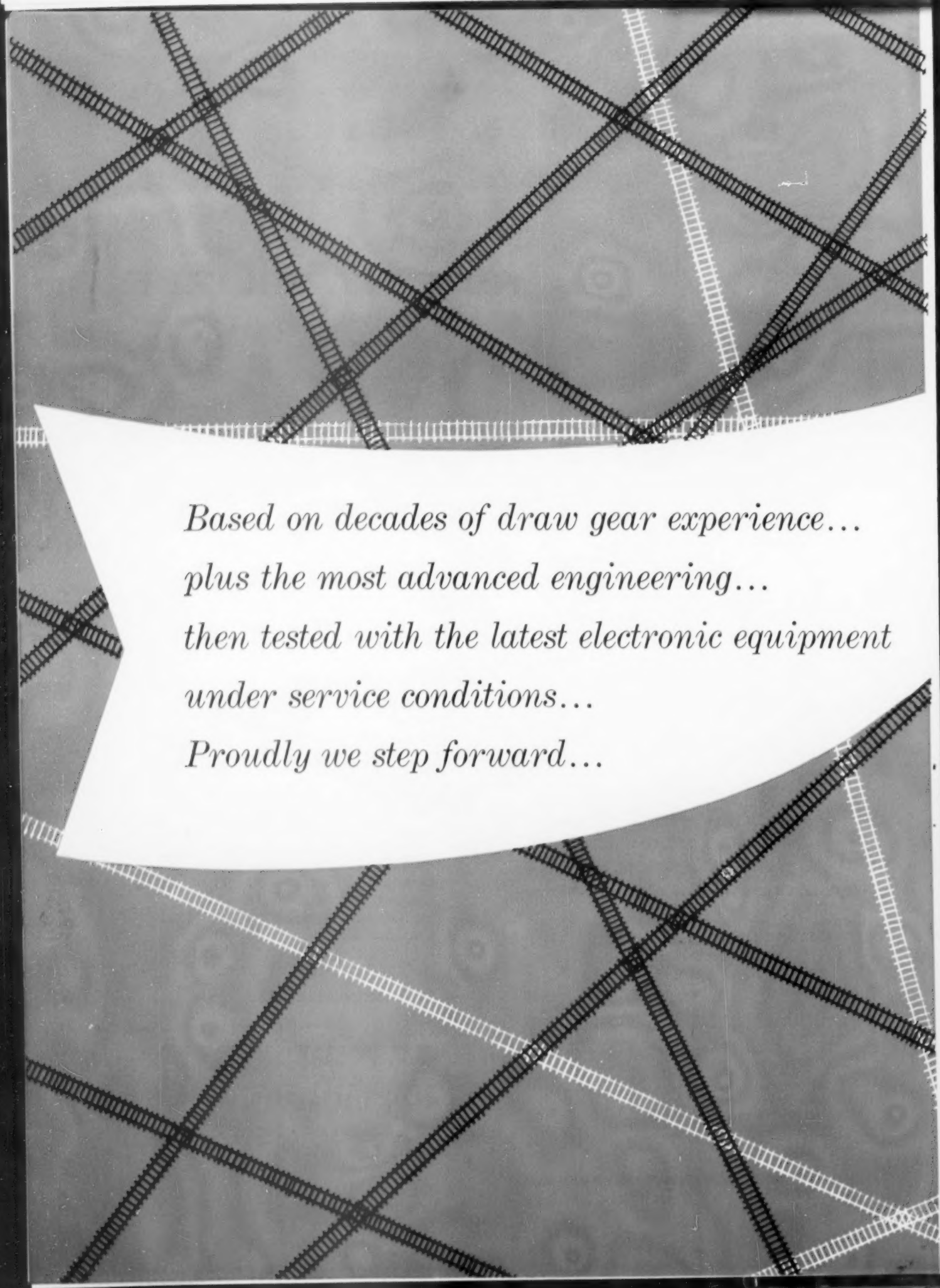
STYLE E-2
Volute Snubber Spring, 2½" Travel—in 50-Ton Group

Following the widespread acceptance of the Holland RS-1 Ride Stabilizer Unit for Existing Equipment (shown in small model), we are now about to present the new Holland Ride Stabilizer Package (shown in large illustration). Advance details will be ready to show convention visitors.

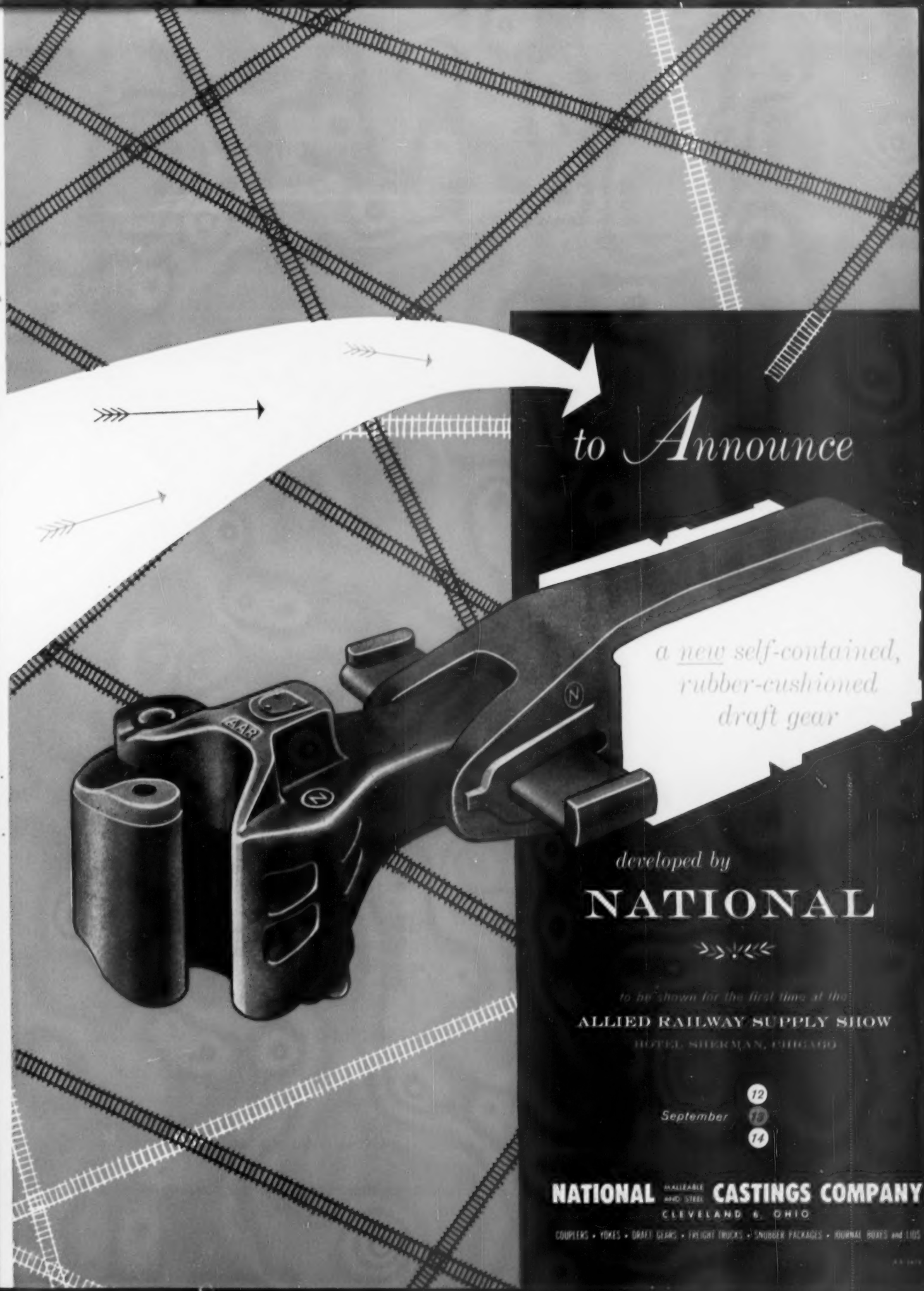
Ask for descriptive bulletins.

HOLLAND COMPANY

332 S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS



Based on decades of draw gear experience...
plus the most advanced engineering...
then tested with the latest electronic equipment
under service conditions...
Proudly we step forward...


to Announce
a new self-contained, rubber-cushioned draft gear
developed by
NATIONAL
to be shown for the first time at the
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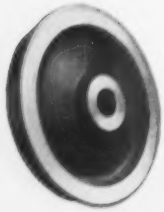
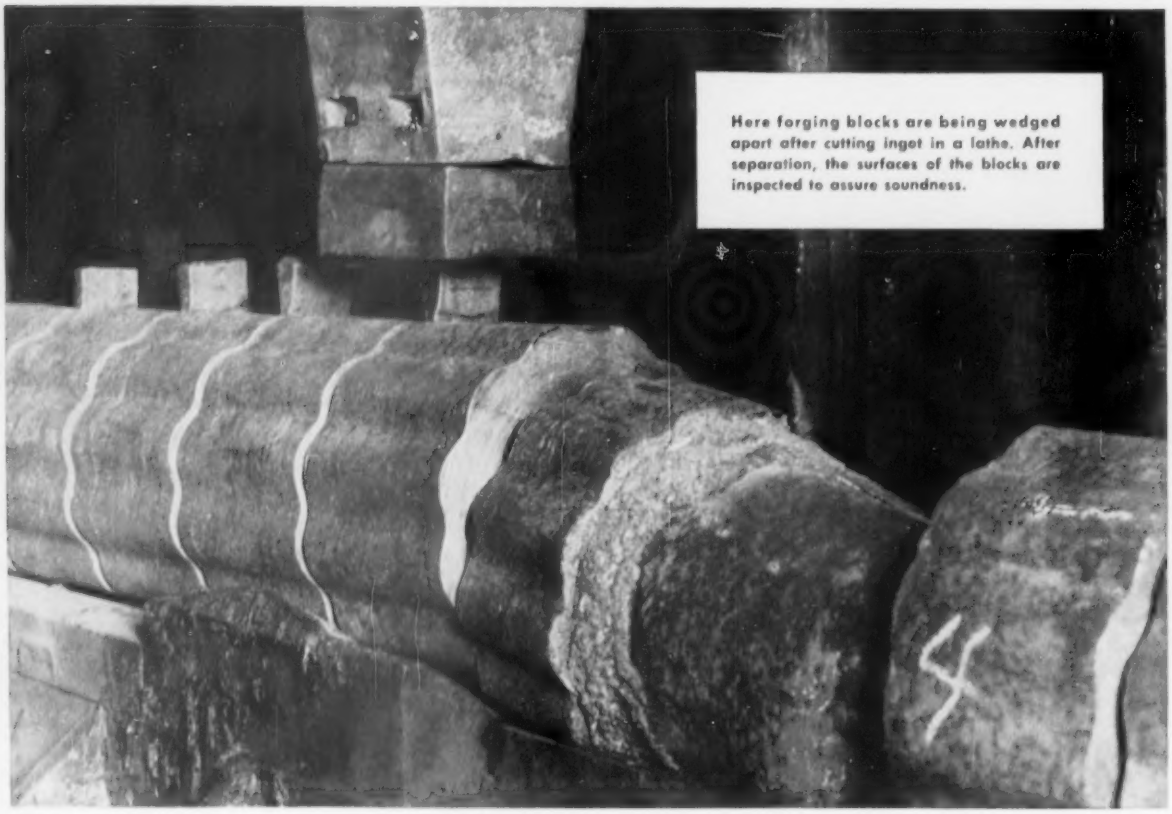
COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • SNUBBER PACKAGES • JOURNAL BOXES and LIDS



Why there's nothing to top an Armco freight car wheel



Here forging blocks are being wedged apart after cutting ingot in a lathe. After separation, the surfaces of the blocks are inspected to assure soundness.

Each Armco Wrought Steel Wheel starts as a slice of an ingot. The "hot top" is discarded because only metallurgically sound steel from the body of the ingot goes into these wheels.

Slicing the ingot makes possible careful inspection of the cross-sectional surfaces before forging and rolling into a car wheel. This is but one of the many special precautions regularly taken by Armco in the manufacture of car wheels.

Wrought steel wheels are standard for diesel and passenger car service, because they are the best available.

Why take less than the best for your revenue-producing freight service? Here's what you get in Armco One-Wear Wrought Steel Wheels:

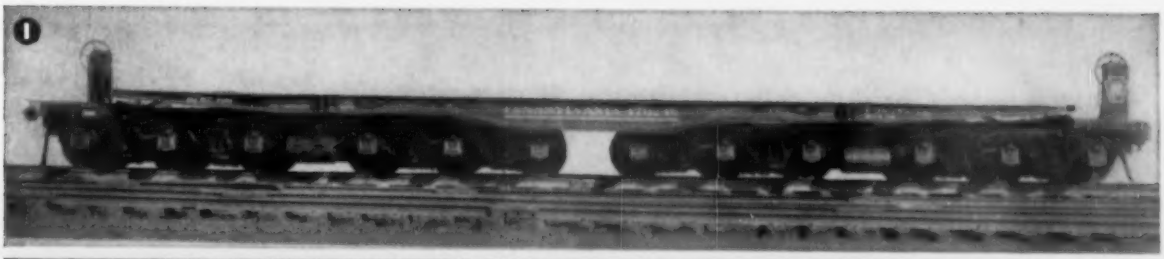
- Long Life—usually still serviceable when car needs major repairs
- Faster freight schedules with greater safety
- Shipper satisfaction—less train delay to set out cars
- Low maintenance

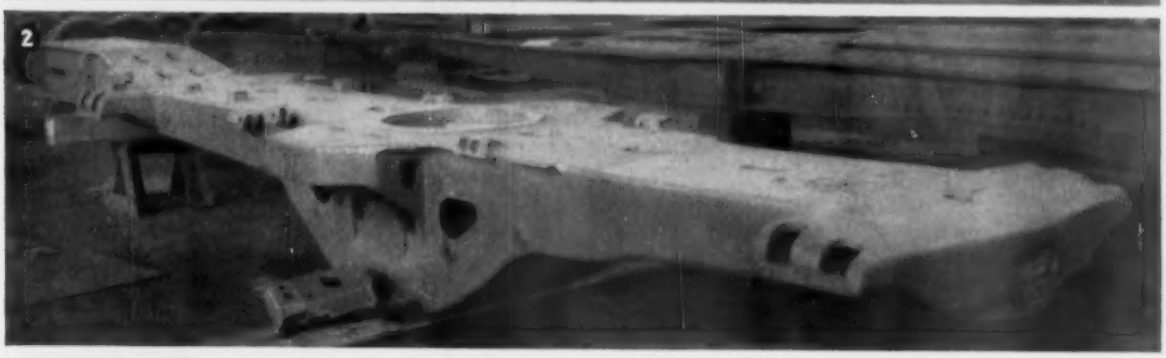
For further information on Armco Wrought Steel Wheels, phone the nearest district office or write us.

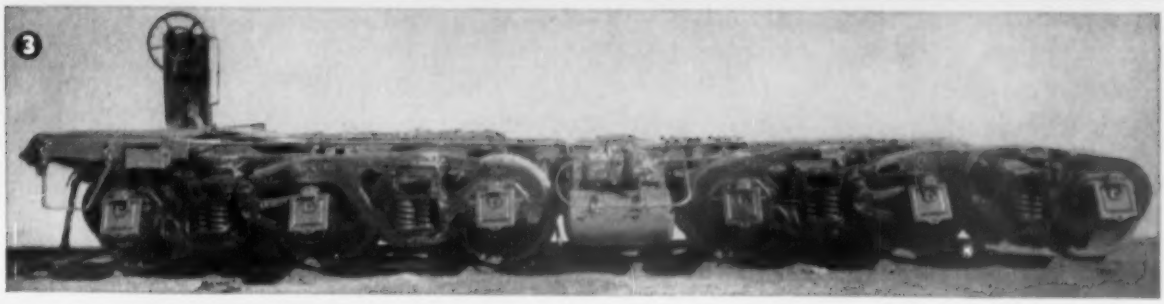
ARMCO STEEL CORPORATION 1555 CURTIS ST., MIDDLETOWN, OHIO

SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION







1. **293-3/4-ton load limit** is a feature of this 58-foot flat car built at the Altoona shops of the Pennsylvania Railroad for extra-heavy and extra-large cargo.

2. **Big span bolster** notable for strength in shallow sections. Cast of 1.25% nickel, 1.50% manganese steel by Buckeye Steel Castings Co., Columbus.

3. **This 12-wheel truck** was designed by Buckeye Steel Castings Co. Distance between centers of the two trucks for 250-ton car is 29'-3".

250-ton capacity car required cast nickel alloy steel to minimize height

Height reduced *to the absolute practical minimum.*

That was a basic requirement of this giant 12-axle flat car. Designed extra-long, it transports extra-large and heavy generators, turbines and other machines . . . assembled. Thus, it eliminates need to disassemble for shipment and reassemble at destination.

And it required cast nickel alloy steel to minimize height. For instance, by providing strength needed in a 10,500-pound, 22½-foot span bolster of unusually shallow section.

One of the largest bolsters ever made, it was cast in nickel-manganese steel to meet AAR Specification M 201, Grade C. And its properties exceeded these minimums:

Tensile Strength, psi		90,000
Yield Strength, psi		60,000
Elong. in 2"	%	22
Red. of Area	%	45

This cast nickel steel also provided the strength needed in the car's two smaller truck bolsters, and in the couplers.

No matter what your metal problem, we'll be glad to help you with our wide practical experience in this field. Send the details of your difficulty, for our suggestions. Write us now.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

Versatility . . . Light Weight . . . High Heat Conductivity!

PISTONS OF ALCOA ALUMINUM HAVE ALL THREE!

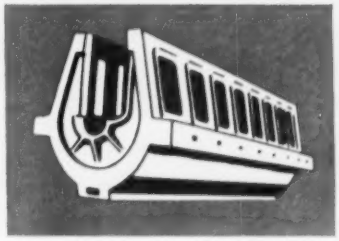
Only Alcoa produces all three types of pistons —permanent-mold, semipermanent-mold, and forged. Sizes of Alcoa® Pistons range from the smallest to 21" in diameter, and they may be ordered with or without inserts for added ring groove life.

Alcoa Aluminum Pistons weigh less—making possible increased engine speeds and resulting in increased horsepower.

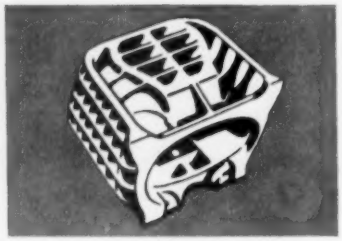
Aluminum's high heat conductivity lowers surface temperatures and allows greater engine output without increasing operating temperatures. To get the complete story on *all* Alcoa Aluminum products for the diesel industry, write: Aluminum Company of America, 1986-J Alcoa Building, Pittsburgh 19, Pa.

NEW TYPE OF PISTONS FOR FUTURE ENGINE DESIGNS

For diesel manufacturers who now have engines in the design stage, Alcoa's research and development teams have produced new types of aluminum pistons which embody many highly desirable features. While they are not yet in full production, Alcoa is ready to talk to manufacturers of high output engines—and to discuss the possibilities of *greater power from the same size engine!*

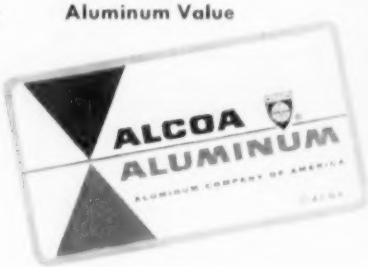


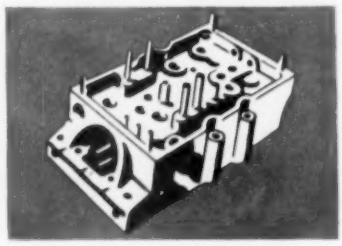
CRANKCASES AND FRAMES of lightweight Alcoa Aluminum give diesels higher horsepower-to-weight ratios, increase efficiency in operation.



SUPERCHARGING AND SCAVENGING are more efficient through the use of aluminum. Here, too, diesels can save weight through the use of aluminum.

Your Guide to Aluminum Value





CYLINDER HEADS of Alcoa Aluminum distribute heat better, allow increased engine ratings. They also mean lighter weight, easier servicing.

IT'S HYATTS AGAIN FOR NEW PIGGY-BACK CARS... THIS TIME ON THE ERIE!

Seems significant, doesn't it, that practically all the new flatcars designed for hauling highway trailers are being built with *roller bearings?* Pretty conclusive proof that where speed and delay-free dependability count, *railroads recognize roller bearings are the answer!*

It's even more significant that so many of these piggy-back cars have HYATTS.

To make sure *your* road will get its full share of this profitable new revenue, make sure your piggy-backs will ride on roller bearings. And to make *doubly* sure of minimum motive power, maintenance and lading damage costs, make those roller bearings HYATTS!

If you're not sure why, we'd like a chance to show you—*right now.*

HYATT

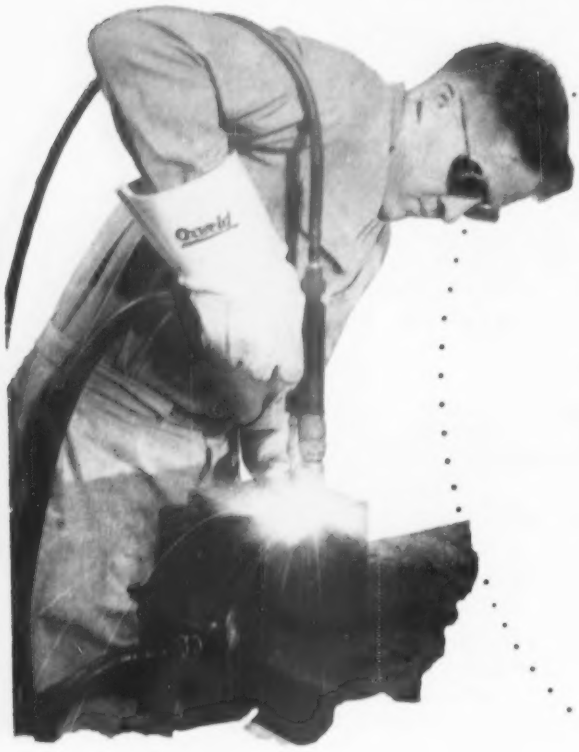
ROLLER BEARING JOURNAL BOXES

RUNNING MATE OF FASTER FREIGHT

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

Spot, Plug, and Tack-Weld

with the new SIGMA SPOT-WELDING *process*



- Joins metals up to ¼-in. thick
- Adds filler metal automatically
- Welds from one side of the joint
- Shields weld area with inert argon gas
- Operates on Constant Potential power supply

Spot, plug, and tack-weld with one torch. With sigma spot-welding you can make strong spot welds quickly on lapping metal sheets up to ⅛-in. thick, plug and tack-welds on metals up to ¼-in. thick—and you need access to only one side of the weld joint. Use it on carbon, galvanized, or stainless steel, and copper-base alloys.

It's easy to use. Position the "muzzle" of the water-cooled torch and squeeze the trigger—the machine does the rest. A consumable wire electrode is fed into the weld area as filler metal. Inert argon gas protects the weld from the air. You can make up to 10 welds a minute, with a completely automatic welding cycle.

Constant Potential adds to efficiency. Sigma spot-welding equipment operates on constant potential power supply to give you the benefit of simplified controls, sure starting, and precise arc voltage. Weld-cratering and wire-sticking are eliminated. Welds are smooth and consistently uniform.

Your local LINDE representative will be pleased to give you booklet F-8778 and more detailed information on the sigma spot-welding process.

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

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Division of Union Carbide Canada Limited, Toronto

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Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - -

Precision Parts by MAGNUS

mean LONGER, SAFER MILEAGE

for Diesel Locomotives

- *Perfectly mated bearing halves*
- *Heat-resistant Satco lining metal*
- *Interchangeable double keeway*
- *Available for all makes and types of diesel-electrics*

High Mileage

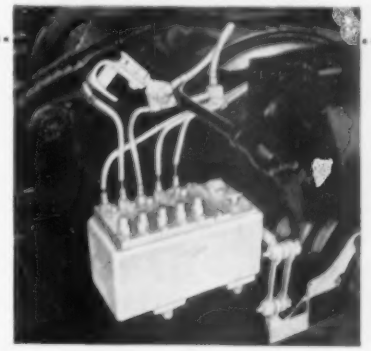
traction motor support bearings for LONGER ROAD LIFE

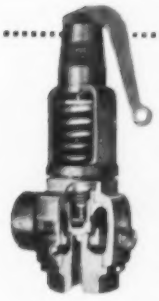
The extra precision that goes into Magnus traction motor support bearings pays off in longer, trouble-free mileage on the road. Quality control of metal mixes, high precision boring and final testing of mated bearing halves *under load* assure an extra margin of dependability — you can't buy a better bearing.

These Magnus HIGH-MILEAGE bearings are available for replacement on all types and makes of diesel-electric and electric locomotives and MU cars. For the complete facts, get your free copy of Bulletin No. 6000.

D-16 FLANGE LUBRICATOR increases mileage between wheel turnings up to 40%

This new, *more positive* method of flange lubrication not only gives greatly extended wheel life, but substantially reduces shop costs, too. Oil pressure to each flange is positively controlled by six individually adjustable pumps that are gang-operated from a common linkage to the truck frame. Unit operates only when locomotive is moving. Can be used to lubricate center pin wear plate also, if desired. Full 16-pint capacity for extra mileage between refills. Write for complete information.





MAGNUS 391 SAFETY VALVE

for dependable overload protection on diesel locomotive steam generators

This high-precision safety valve is specially made for railroad service on diesel locomotive steam generators. Opening and blowdown pressure adjustments are easily accessible and self-locking. Flexible metallic bellows prevent escape of steam into the generator compartment. Write for full details.

MAGNUS
Metal Corporation

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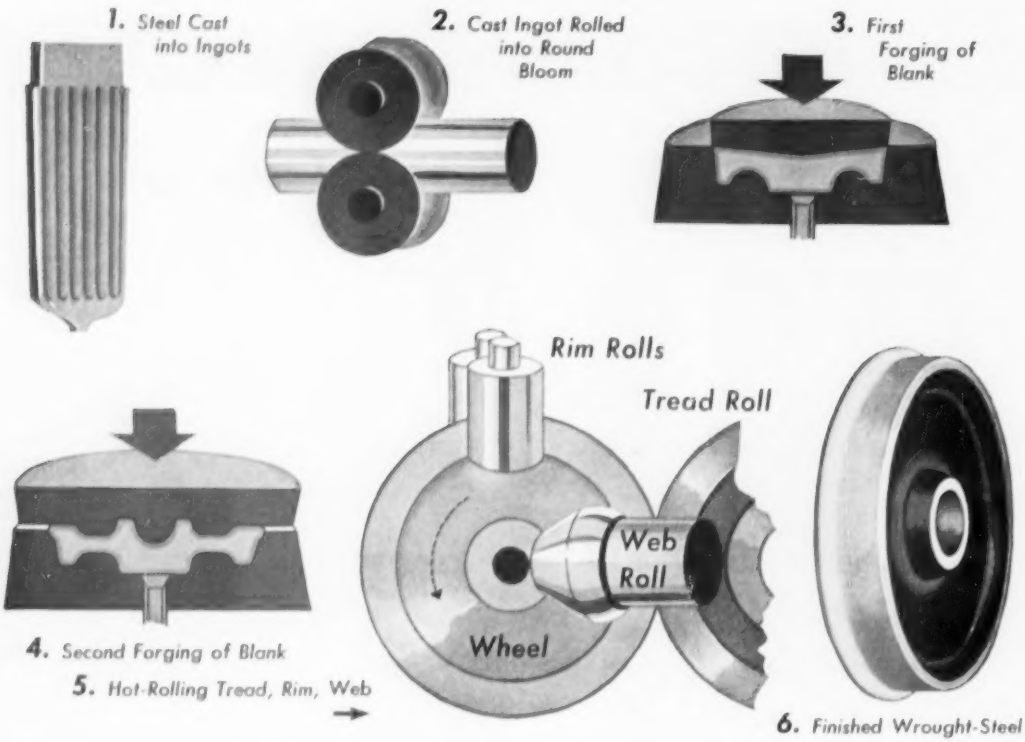
Forging and Rolling Make Better Wheels



The superior properties of wrought-steel wheels are widely recognized. But the technical "reasons why" may not be so generally understood. Certainly one fundamental reason is the working that the steel receives between the cast ingot and the finished forged wheel.

At Bethlehem this working occurs at four different stages of manufacture: as the cast-steel ingots are rolled into round blooms; as the wheel blank receives the first and second forgings; and as tread, rim, and web are rolled in the vertical mill. Each of these four important steps has a marked beneficial effect on the steel, and hence on the quality of the finished wheel itself.

Bethlehem wrought wheels are made from steel specifically melted to meet every standard of AAR specifications. The steel is *right*—the first fundamental of a durable railway wheel. And wherever heat-treating is specified, it is expertly handled in the most modern equipment.

When a Bethlehem wrought-steel wheel emerges in finished form, it is ready for unlimited application and interchange. Remember, Bethlehem is a veteran builder of AAR-approved railway wheels. For freight service alone, we have furnished more than 2,000,000 . . . with the total growing daily. High-quality passenger and diesel wheels are also Bethlehem specialties, and are widely used in the country's blue-ribbon trains. Need anything more be said?

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

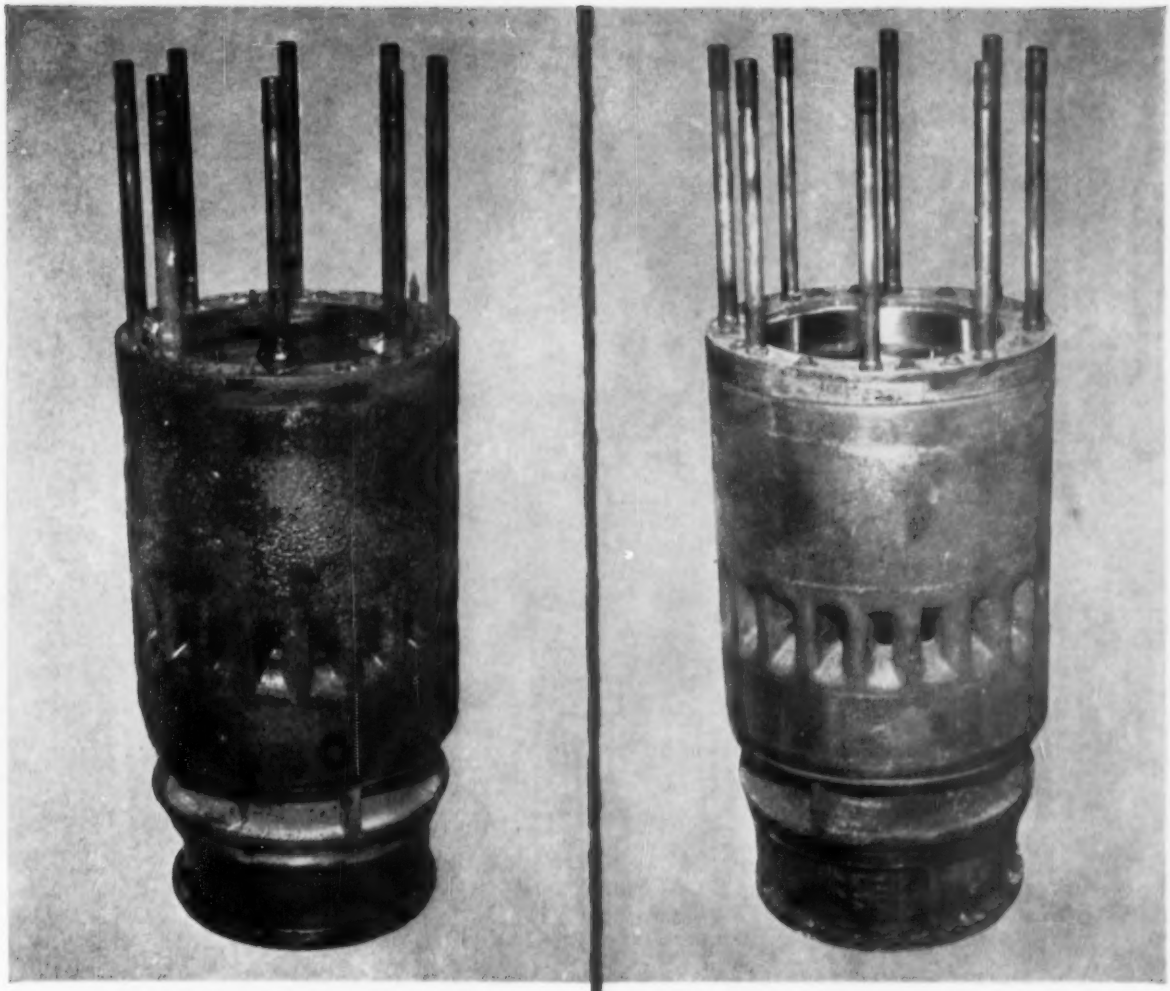
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM WROUGHT-STEEL WHEELS

COMPANIONS TO BETHLEHEM FORGED-STEEL AXLES

FREIGHT • PASSENGER • DIESEL

BETHLEHEM STEEL



Note the hard carbon burned on this liner. See how the ports are caked up. Isn't this typical of the worst parts that must be cleaned in your shop?

The same liner after soak cleaning in Pennsalt Multi-Metal Cleaner (8 oz./gal.—180°) and a hot water rinse. No need for brushing—there's no residue left! The liner is ready for inspection and re-assembly.

Caked carbon completely removed without brushing by PENNSALT MULTI-METAL CLEANER

Here's a cleaner that really cleans! Paint, hard carbon—all the tough films that form on the internal operating parts of a diesel—soak away. The surface is left clean, ready for processing. It works equally well on steel or aluminum parts—*cleans either metal safely in the same tank.*

Multi-Metal Cleaner is a pleasure to have in your shop. It doesn't put out disagreeable odors. It doesn't need frequent recharging. It can be hosed out of the tank when it's time to dump and recharge.

Your Pennsalt Railroad Maintenance Specialist will be glad to demonstrate Multi-Metal or any of the other hard-working Pennsalt Cleaners. Give him a call today. Or write: Pennsylvania Salt Manufacturing Company, EAST: Three Penn Center Plaza, Philadelphia 2, Pa. WEST: Woolsey Building, 2168 Shattuck Avenue, Berkeley 4, Calif.

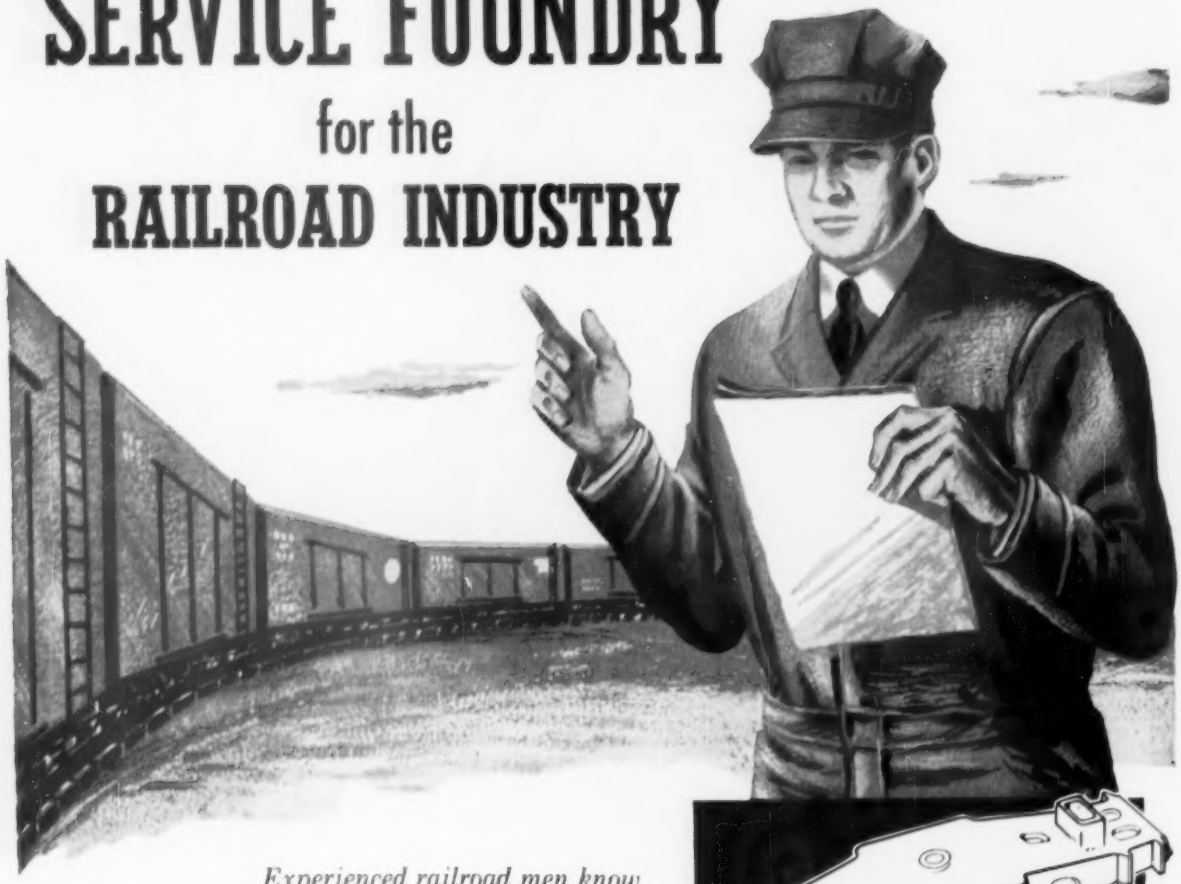
Favorite of the men in the shops

Pennsalt Chemicals

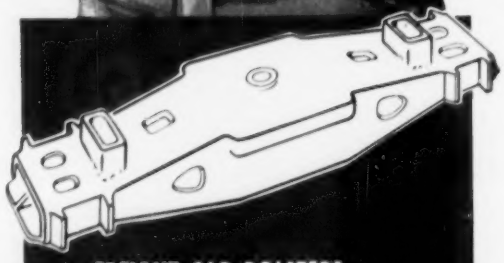
SERVICE FOUNDRY

for the

RAILROAD INDUSTRY



Experienced railroad men know the value of good sound castings required in the manufacture of freight cars. "SERVICE" has the facilities and engineering experience to cast and machine these and other type castings to meet your most exacting requirements. May we quote you on your next requirements . . .



- FREIGHT CAR BOLSTERS
- FREIGHT CAR TRUCK CASTINGS
- DRAFT GEAR CASTINGS, ETC.

— all to your drawings and specifications.

You can depend on "Service" for satisfactory results.

SERVICE • INTEGRITY • EFFICIENCY

SERVICE FOUNDRY a division of **AVONDALE MARINE WAYS, Inc.**

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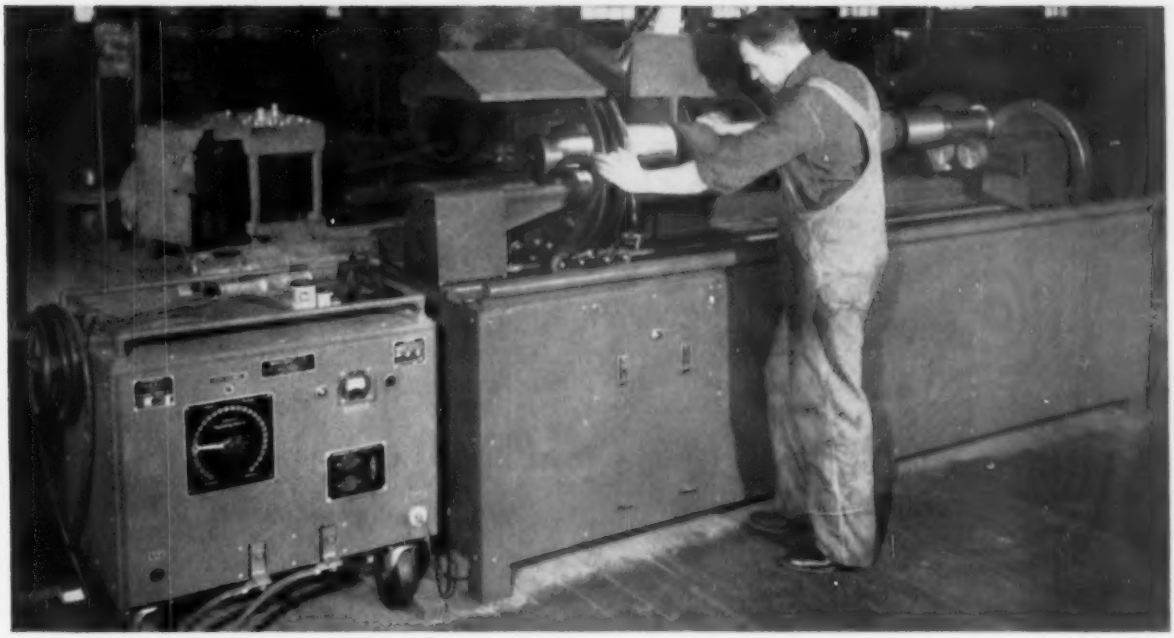

WHEN YOU INSPECT AXLES . . .

Reduce Your Man-Hours

Find *all* the Cracks, Not Just Some of Them

MAGNAGLO equipment — designed especially for railroads — gives you low-cost inspection in the least possible man-hours. It makes inspection fast — and fully reliable.

When you spend any man-hours to inspect axles, you want to be sure you find *all* cracks. This is insurance against road failures that can range from costly to disasterous. On freight cars today's inspection need is MAGNAGLO. For passenger car axles MAGNAGLO is a *must!*

MAGNAGLO makes sure that *every* axle that goes back into service is *fit* for service. Under MAGNAGLO black light, any cracks instantly show as glowing, flourescent indications, impossible to miss. You *know* whether your axles are free from cracks. It is also the *only* way to detect copper penetration in axles, one cause of axle failure.

MAGNAFLUX CORPORATION

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OTHER EQUIPMENT AVAILABLE — FOR MAGNAGLO ON MOUNTED AXLES. WRITE US — WE'LL SEND FULL INFORMATION.

SPECIALLY DESIGNED — FOR AXLE INSPECTION

THE MAGNAGLO XRTL (above)

Designed to reduce handling in small and medium shops. Enables one man to inspect more axles with MAGNAGLO better than two men could in the past with old style equipment. A special axle supporting roller makes it easy to rotate axles. An external Magnaflux power pack used with XRTL also can be used for general shop inspection. A similar unit, the RTL, includes a built-in power pack.

THE MAGNAGLO RTLL

Developed especially for high volume inspection. Gives you all the advantages of MAGNAGLO, plus automatic axle roll-in, automatic motor driven magnetizing coils, motorized rotation of axles and ejection. Heavy duty construction is engineered for day-after-day shop use in high speed inspection. Man-hour needs are *at minimum!*

MAGNAFLUX

TEXACO *AIRTAC* assures maximum air filter efficiency

TEXACO *AIRTAC* is a special gel-type air filter coating designed to assure maximum collection efficiency from all railroad diesel air filters. It has remarkable stability under application temperatures, high demulsibility, and is non-foaming. You can count on it for—

Smooth, Uniform Coverage: *Texaco Airtac* adheres readily, provides a smooth, uniform coating without dry spots or excess accumulations that might cause webbing on the screens.

High Dust Retention: *Texaco Airtac* traps and retains all dust it contacts. As dust builds up, the Texaco Airtac is "wicked" through it—always presenting a fresh oil surface to ensnare further dirt, regardless of air velocity or dust concentration.

No Creeping, No Dripping: *Texaco Airtac* will not creep, drip or melt off screens even at ambient temperatures as high as 185° F. Nor will rain or snow cause loss of coating or impair efficiency.

Texaco Airtac is easy to apply, easy to remove. For full information, call the nearest Texaco Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis or Atlanta. Or write The Texas Company, *Railway Sales*, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Railroad Lubricants
AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES

TUNE IN . . . TEXACO STAR THEATRE starring JIMMY DURANTE on television . . . Saturday nights, NBC

EDITORIALS

Ton-Miles vs. Maintenance

The maintenance department says "Be kind to our locomotives. Don't overload them—don't run them too fast, and let us see them more often." To this, the operating department says, "This is a tonnage road. Revenue is by the ton-mile, and who do you think pays your salary anyway."

The operating department has a good point there, and in most cases, it would be hard to prove that some added revenue did not pay good dividends on a little added maintenance. And it is an easy temptation and a great convenience if one can take a little more out of the motive power and thereby clean up a traffic situation. Horsepower ratings have been going up and for good reason.

On the other hand, there is always the probability that the operators could cooperate a little more with the mechanical department. It is indicated poignantly in the recommendation of builders to foreign operators.

In a number of foreign countries diesel locomotives are purchased without the accompaniment of sufficient spare parts and without adequate shop facilities. Many relatively new locomotives stand on the shop tracks where they are cannibalized for parts. To take care of this situation, the manufacturers recommend that the users derate their locomotives 35 to 50 horsepower. The result is that failures almost disappear and maintenance requirements decline to such a degree that the railroads are able to carry on without great difficulty. The situation shows that maintenance increases sharply under high load.

This practice is scarcely something that could be recommended for American roads, but it does indicate that much could be saved by avoiding unnecessary overloads or even top loads when operating conditions permit.

Fix It or Describe It

The fact that there are today many millions of motorists who drive cars without the faintest idea of what goes on under the hood is sometimes used to question why a locomotive engineman should have to play the dual role of both driver and mechanic when something goes wrong.

Just how accurate is the parallel? And how similar are the effects of a failure?

Few bus, and not too many truck, drivers are able to fix their vehicles if they break down on the road. The results of the failure are, however, quite different from the results of a locomotive failure. To begin with there are many highway service stations and in most areas there will be one close enough to perform at least emergency repairs. Second, if a truck, bus or automobile breaks down on the highway, it does not tie up other traffic like a train stalled due to locomotive failure.

This is the case for the side that contends that the enginemen should be taught the fundamentals of trouble shooting so that he can cope with failures that arise. The other side of the argument is that you might be able to train an engineman better in the handling of his unit if you could devote all time available for instruction to teaching him the operation of the locomotive so that he can do a better job of train handling.

Those who doubt the wisdom of attempting to make a mechanic out of a locomotive engineman wonder just how good a mechanic you can make in the limited time available for training in both operation and trouble shooting. Some roads feel that only a minimum of such training is now needed since the advent of train radio. They feel that the primary emphasis should be on teaching the engineman to describe his failure correctly so that a diesel maintenance man at the nearest terminal can diagnose the trouble and prescribe the remedy. It cannot be denied that such a man has a far better background and knowledge for figuring out what to do than most enginemen could possibly acquire.

Letters To the Editor

Why Use Inadequate Couplers?

TO THE EDITOR:

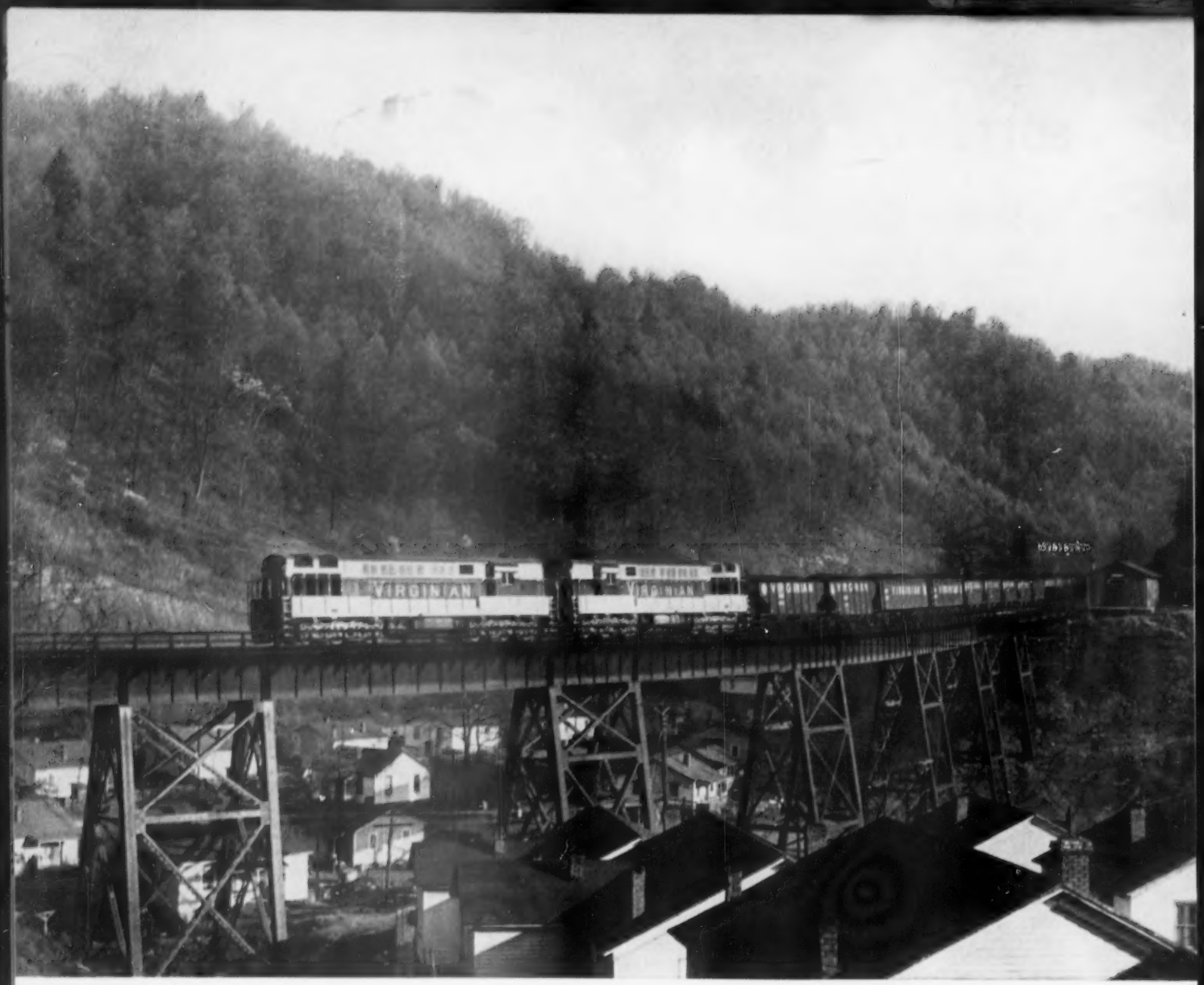
It is now three years since the new Type F coupler received AAR approval for unlimited application to freight cars. I have no personal interest in this coupler, but as former chairman of the AAR Committee on Couplers and Draft Gears it seems to me unfortunate that so many railroads are continuing to build new freight cars equipped with the old and now obsolete Type E coupler.

The Type F coupler was designed and produced under the direction of the Mechanical Committee of the Standard Coupler Manufacturers in response to a demand from the Coupler and Draft Gear Committee, acting on behalf of the railroads, for a coupler that would fully meet the much more severe requirements of present day freight service. Exhaustive tests, both laboratory and service, have shown that the manufacturers completely succeeded in carrying out their assignment.

This Type F coupler has all the advantages of both the Type E rigid shank and the alternate standard swivel shank couplers, and none of the disadvantages of either. It has greatly increased strength and eliminates more than half of the present free slack, leaving only $^3/_8$ in. of slack per pair of couplers.

Also incorporated are practically all of the outstanding features of the latest Type H tightlock coupler for passenger service, namely, complete vertical interlocking of mated coupler heads which serves to keep cars in alignment and resist jackknifing and overturning in derailments, longer life due to restriction of vertical movement between mated couplers and elimination of vertical slipovers.

Unlike the Type E, the Type F cannot be opened by bouncing of cars, and the dangerous cross-key is eliminated entirely. The strength of the Type F coupler shank



THE VIRGINIAN

Replaces freight steam power with Fairbanks-Morse Power

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is more than 70% greater even than that of the Type H tightlock coupler, the cost of which is much greater.

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ICC Accident Bulletin No. 122, covering the year 1953, the latest available, shows that broken wheels of all kinds caused a total of 266 derailments in that year, whereas coupler and draft rigging failures caused a total of 332 derailments in the same period. Of the latter failures it is estimated that at least 193 would have been prevented by the use of Type F couplers.

The railroads have spent several hundred millions of dollars for diesel locomotives in the past few years, but it takes more than diesels to run a railroad. Why should any railroad in this day and age build new freight cars and equip them with couplers designed for conditions that existed 25 years ago? This appears especially shortsighted in view of the fact that if the car when built is not designed for application of the improved Type F coupler such application will cost a great deal more if made later, and this will almost certainly be required by the AAR within a comparatively few years.

H. W. Faus,
Engineer Locomotive Equipment (Retired)
New York Central System

An Attack on Tank-Car Hot Boxes

To The Editor:

Intensive railroad efforts to combat hot boxes are quite effective in some specific instances, but in general, the results are spotty. For example, based on miles per hot-box-car set off between division terminals, as reported by the AAR, the record of 363,197 miles for March, 1955, was not as good as in March, 1954, but better than in March, 1953. The comparison was just the reverse for the month of February in the last three years. On the other hand, the record of 601,256 miles for January, 1955, much better than for the same month in either of the two previous years.

Hot box mileage also varies with the type of equipment or service, being only about one-third as much for tank cars as for other interchange freight cars. To meet the serious situation caused by recurring hot boxes on private tank car equipment, the west coast districts held a number of meetings earlier this year at which representative tank-car owners and railway operating and maintenance men discussed causes and effects and decided on remedial action which has already tended to reduce train delays, repair costs and derailment hazards.

Contributing defects cited as most often responsible for hot boxes include: binding center plates, improper side-bearing clearance, worn brasses, defective dust guards, journal bearings, wedges and packing retainers. Most of these defects center in the trucks which, by and large, are not up to modern standards especially in tank cars. In fact, it is reported that only eight per cent of the tank cars in service are equipped with long-travel springs and snubbers, the balance having old-style trucks with short stiff springs and no snubbing devices.

Obviously, there is far too-prevalent thought that any old kind of truck is good enough for a tank car, and perhaps it is true that tank car shipments are less easily damaged by rough riding trucks than average merchandise loaded in box cars. But what about the effect in promoting hot boxes and increasing car maintenance cost? It can hardly be questioned that the installation of modern easy-riding trucks in tank cars as fast as practicable is a good investment for the private car owner as well as a help to railroads which operate the cars and shippers who use them.

Besides the installation of new trucks, and important point of attack is in better maintenance of existing trucks on tank cars now in service. It was repeatedly brought out at the meetings mentioned that some private tank car owners take cars into their own shops and do a beautiful job of repairing, painting and stenciling everything down to the trucks, but peprmit trucks to go out of shop "as is", if there is any service metal left in wheels and other wearing parts above the actual condemning limits.

Another bad practice frequently encountered, apparently, is failure of tank car owners to authorize necessary and badly-needed truck repairs when tank cars are at railroad shops or repair tracks for other work. Nor are the railroads blameless, as repair track forces frequently allow "in date" journal boxes to pass through without attention on the theory that whatever is necessary will be done at the next classification yard. As a result, these particular boxes get no attention at all and are potential sources of hot box trouble.

The solution to these difficulties seems obvious and needs little elaboration. Modern equipment, materials and practices will help, but are useless without due attention to human factors by adequate training and supervision.

George Bostwick

NEW BOOKS

MECHANICS OF MATERIALS. By Philip G. Laurson and William J. Cox. Published early this year the volume offers an excellent presentation of the principles underlying machine and structural design, as well as its correlation of theory and practice.

The new edition gives increased emphasis to the determination of stresses by the methods of statics and the use of free-body diagrams. Largely rewritten, the chapter dealing with mechanical properties of materials has been further clarified and brought up to date. Other changes include the revision of tables of structural shapes to conform to present standards, while widely used specifications serve as the basis for allowable stresses.

Mr Laurson is associate professor emeritus of civil engineering, Yale University School of Engineering.

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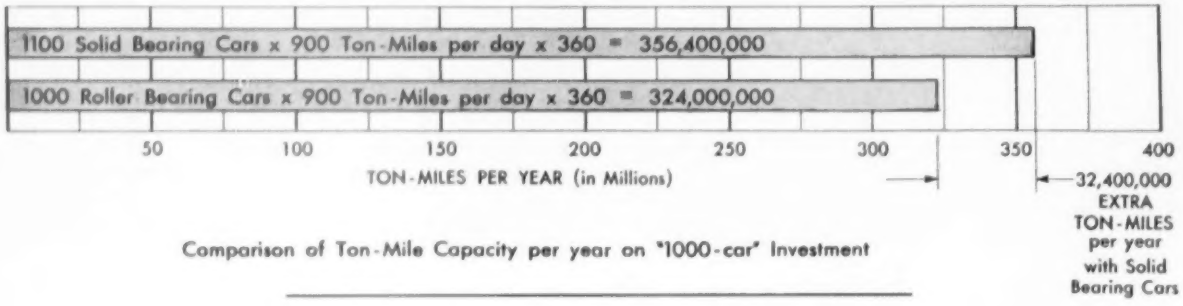
1100 Solid Bearing Cars x 900 Ton-Miles per day x 360 = 356,400,000
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100
150
200
250
300
350
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EMD Reefer Designed for Minimum Maintenance

The Electro-Motive design of mechanical refrigerator car about to go into production differs from conventional construction in several important ways. Among the basic departures are:

1—A different type underframe construction and the car body mounting.

2—A novel method of opening the doors, making the 8-ft door practical for reefer service.

3—The way the insulation contributes to the structural strength of the body.

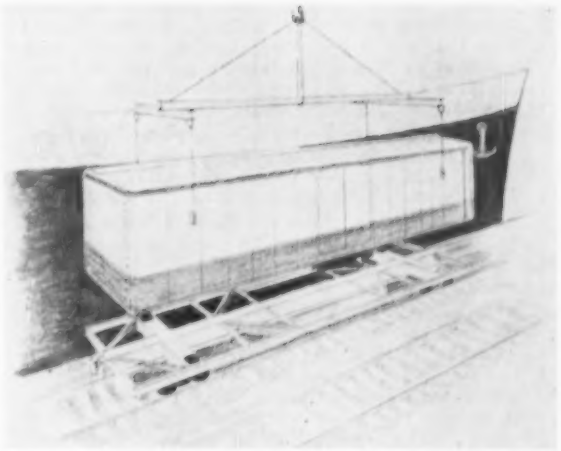
4—That all through metal paths to the refrigerated space are blocked.

5—An induction-type generator, eliminating slip rings, brushes and voltage regulator.

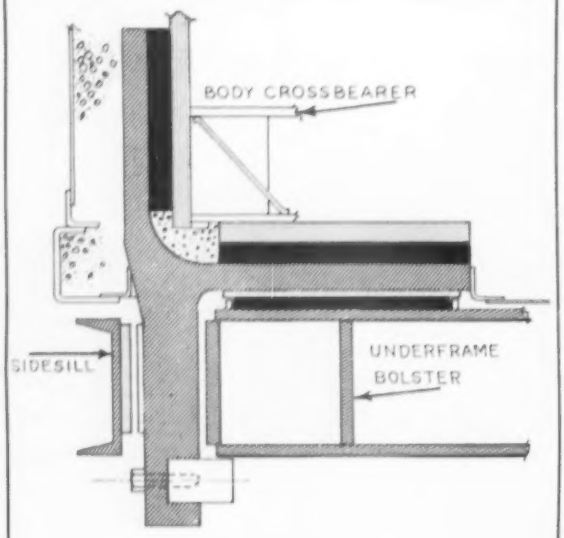
The carbody of the "Frigifrater" as the new car is named by EMD, is completely separated from the steel underframe. Fiber supports and cushioning devices permit the carbody to slide freely over the underframe, within practical limits, thus protecting the carbody, refrigeration equipment and lading from damage of impact inertia caused by slack action of the train or switching operations.

The underframe is reduced in function to that of a buff and drag structure only. It is essentially a flat car with four pads on which the body rests. Bending action under buff load has been practically eliminated. The car will stand 300,000-lb. buff load, the same as passenger cars and twice the design figure for freight cars. The underframe has no camber. The buff load goes straight through approximately on the neutral axis, causing only compression and no bending.

Because the carbody is supported by the underframe at two places on each bolster, the weight is transmitted directly through the bolsters to the trucks. It does not go through the side sills, end sills, or the center sill. Cushioning of the body and its load against impacts is done in two ways. The first is a conventional rubber draft gear. Second is a body movement of 2 in. in either direction on the underframe. The cushioning medium for this movement is also rubber. The two major moving parts of this cushioning device are mounted to the body and to the underframe under the center of the doors.



The body can be lifted free of the underframe by engaging four lifting pads mounted between the inner and the outer box.



Two important features of the Frigifrater are shown by this sketch:

1—The sliding connection between the car body and the underframe.

2—The complete absence of a through metal path between the inside and outside of the car for the transmission of heat.

In the above sketch, the underframe members (side sill and bolster) are shown cross hatched—as is the odd-shaped member. The latter is a steel casting about 8 in. long which prevents the body from twisting or skewing on the underframe. It also locks the body to the underframe and prevents separation of the two in the event of a wreck or derailment. Two bolts and lockwashers near the bottom lock each casting to the underframe.

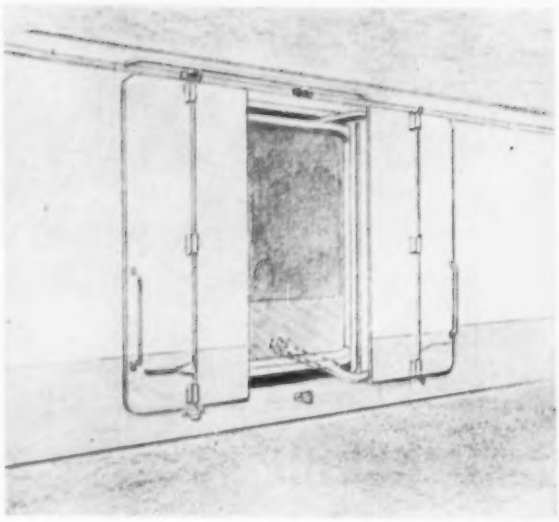
The shaded members are wear plates. The horizontal plate is the one on which the body slides relative to the underframe (a 2-in. movement either way from the designed location, or a total of 4 in.).

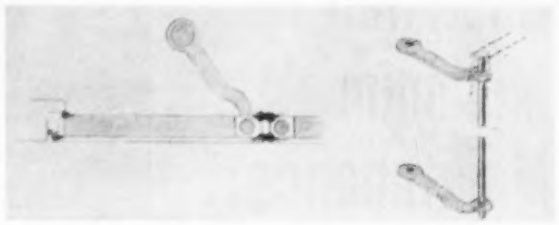
The solid black pieces are phenolic laminate thermal breakers. These are what break up what would otherwise be a continuous metal path for heat transfer. The same material is used to form heavy washers and bushings for all bolts that extend through to the inside of the car body.

To the top and right of these thermal barriers are two steel plates (shown striped) which are welded to the car body. A short portion of what EMD terms the body cross bearer is shown attached to the two steel plates (which are bolted to the steel casting through the phenolic pads).

Thus the body and the steel casting slide longitudinally as a unit on the underframe. At the same time the lower part of the vertical flange because of its close clearance on either side to the underframe cross bearer and to the side sill prevents sideways movement between the body and the underframe.

Removing the bolt and lock washer near the bottom of the steel casting breaks the only direct connection between the body and the underframe. The body can then be lifted free by crane (the fuel lines must also be disconnected) and placed on shipboard or any place else desired. The cooling unit can be operated with the body separated either by supplying fuel to the diesel engine or 220-volt a-c to the refrigerating unit.



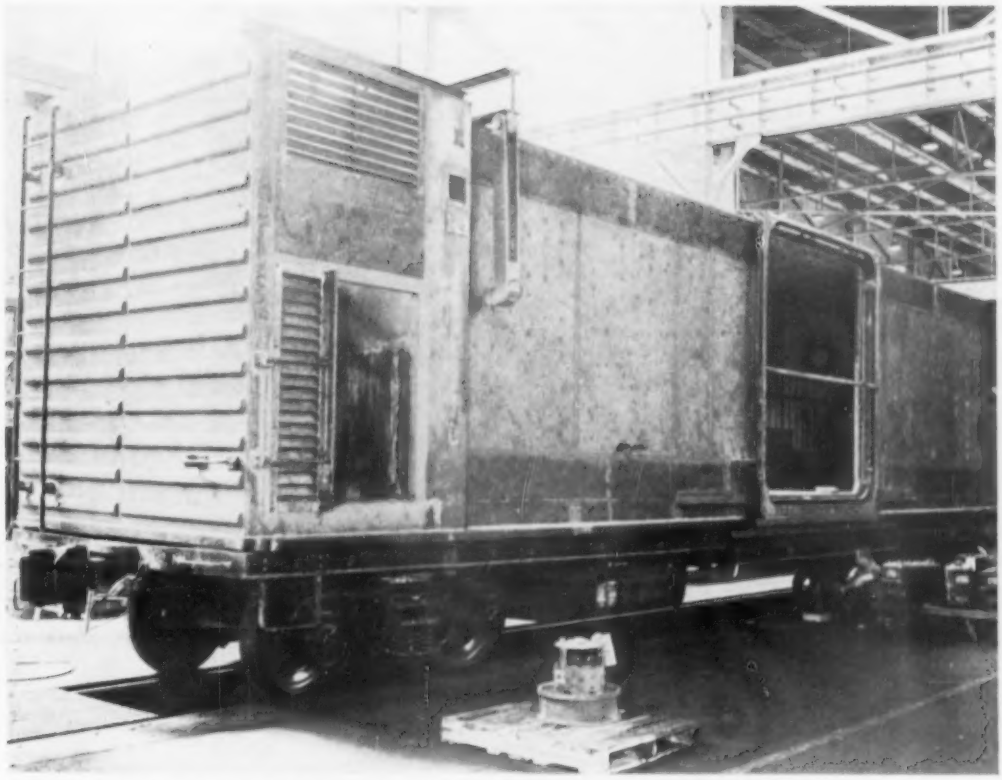


Each door is mounted to a pivoted arm top and bottom. In opening it swings out a maximum of 13 inches. With one door open, the clear opening is 4 ft—with both doors, 8 ft. Vertical clearance above a 48-in. platform is 80 in.

Cold Wall Construction

The carbody is made entirely of steel except for the replaceable plywood lining on the inner side walls. It has an inner and an outer box with the space between the two containing the insulation and the ducts for the passage of the coolant air. The inner box is the strength member; the outer is essentially a tent. The type of insulation used does cause the "sandwich" made by the insulation and the two walls to contribute to the structural strength of the body. This additional strength was not included when designing the body structure. The insulation used is a plastic foam which fills up ths space between the inner and outer steel walls and forms a solid structural member much like that produced when metal is bonded to plywood. This material fills every void. It does not pack down even under great pressure, and does not absorb moisture thus preventing corrosion of hidden steel surfaces.

The all-steel all-welded cold wall lining of the car is surrounded by air ducts fed with captive refrigerated air circulated by blowers. In this manner the heat is blocked on its way into the car instead of being removed after it has entered. The lading is kept moist as well as cold. The refrigerated air that goes over the evaporator (and is partially dehumidified there) does not come into contact with the lading. The captive refrigerated air surrounding the lading compartment is dry and cold, keeping the carbody free from moisture and corrosion. This cuts the need for defrosting to once in seven days (controlled by



The Frigifrater body is built in four basic steps:

1—The bottom pans (the bottom structural member to which the floor is applied) are built and insulated with 6-in. reflective aluminum.

2—The sides and ends are joined together uninsulated. This shell is then attached to the bottom pans.

3—The carbody (minus the roof) has the walls and ends insulated by pouring foam from the top down into spaces between walls.

4—The completed roof assembly, including insulation, is lowered on the body and welded in place.

The refrigerated box, or car body, can be lifted clear of the underframe. The cooling unit can be operated by supplying either 220-volt a-c or diesel fuel.

automatic timer). The only moisture that need be removed is that which may leak in around the gaskets and through the 1¼-in. drain pipe when the moisture is not frozen.

No Metal Heat Paths

The all-metal carbody is so constructed that there is no through metal conduction of heat between the inner shell and outer shell. All inside and outside walls of the carbody are welded to form a vapor tight container. The steel corrugated inside wall is lined with replaceable ½-in. plywood panels to furnish a smooth surface.

The double doors provide a full 8-ft opening to the loading compartment. A novel hinge arrangement enables either or both doors to be opened as required. The doors come out about 15⅝ in. and pivot back to minimize the clearance required at loading docks. Fork lift trucks can go in and out of the car without difficulty. Double seals, round corners and glass polyester resin inner panels all reduce heat leakage to a minimum.

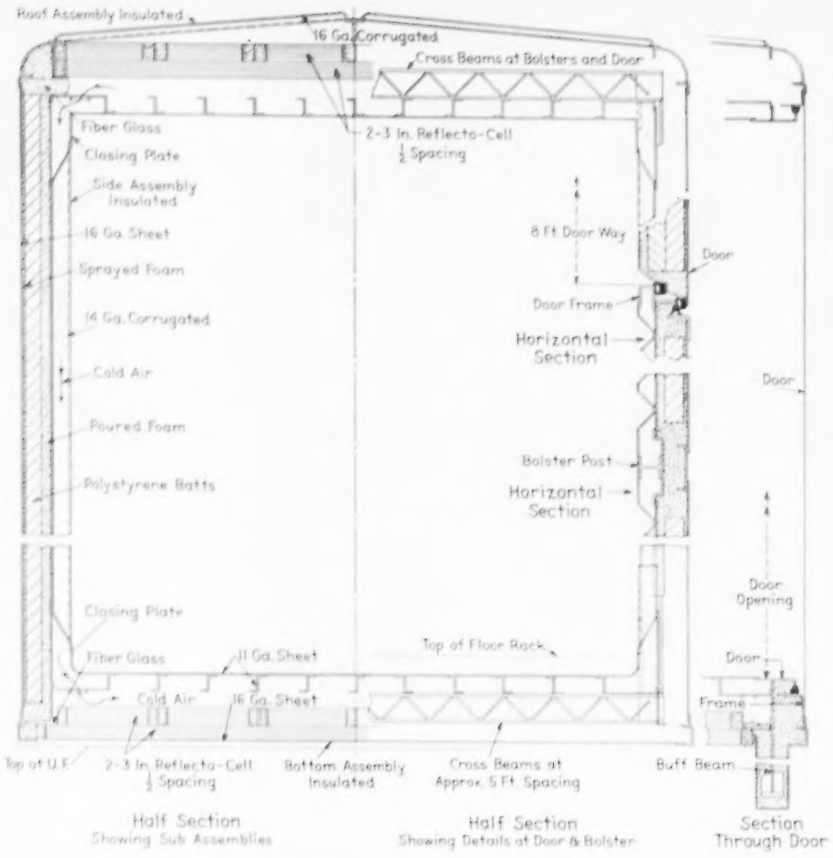
Three Types of Insulation

In the present car, the vertical walls are filled with either a foamed-in-place material and polystyrene batts. Two 2-in. insulating batts are bonded to the inner surface of the outer wall by spraying the mating surfaces with the foamed-in-place insulation. The remainder of the 6-in. space is filled with the poured insulation. If production and price become more favorable, the entire void will be filled with the poured insulation. The floor and ceiling are insulated with a "reflective" insulation consisting of sheets of aluminum separated by spacers, which combine the reflective quality of aluminum and the thermal resistance of the dead-air spaces. All of the insulation is moisture proof, non deteriorating and vermin resistant.

The insulation which is poured in place in the walls and ends is composed of two principal ingredients which are pumped and metered through a pipe into the cavity between the inner and outer boxes. The two ingredients are mixed in a nozzle at the end of a pipe. The chemical reaction causes the mixture of the two ingredients to foam.

The resultant foam has a consistency approximating that of rye bread. All voids are filled because it is applied as a liquid. It does not settle and has a density from 1.5 to 2 lb per cu ft. Its density can be made up to 40 lb per cu ft. At the lower density, however, insulation value is at an economic maximum and the "sandwich" formed by the two steel plates and the insulation is strong enough that 16-gage steel is suitable for the side sheets.

Jacking is done on the underframe opposite the front and rear bolsters. There are also four lifting pads on



Specifications of the Frigifrater

Length over buffer blocks, ft	52
Distance between bolster centers, ft	39
Distance—buffer block to bolster center, ft-in.	6—6
Height over running board, ft-in.	14—11-3/4
Top of center sill to top of rail, ft-in.	3—5-7/16
Width:	
Over side sheets, ft-in.	10—1
Over side ladders (max. width), ft-in.	10—7-3/4
Over grab irons on doors (max. width), ft-in.	10—7-3/4
Over door locks, ft-in.	10—7-5/8
Total inside height, ft-in.	8—10-3/16
Effective inside height (top of floor rack to bottom of fan guard), ft-in.	8—0-13/16
Inside width (inside plywood panels), ft-in.	8—5-11/16
Inside length, ft-in.	44—0-7/8
Total volume, cu. ft	3305
Effective lading volume, cu. ft	3013
Height of door opening, ft-in.	7—11
Width of door openings, ft-in.	8—0
Journal size, in.	6 × 11
Weights:	
Gross weight (fully loaded), lb	210,000
Capacity, lb	127,000 *
Load limit, lb	127,800 *
Light weight (dry), lb	82,200 *
Axle loading (max.), lb	52,500
Operating supplies—fuel oil, gal	400

*Estimated

the car sides reached through cover plates that allow the entire carbody to be lifted from the underframe. Other underframe and body equipment (brakes, type E coupler, rubber draft gear, uncoupling device, ride control trucks, roller bearings, etc.) are standard items.

Both Cools and Heats

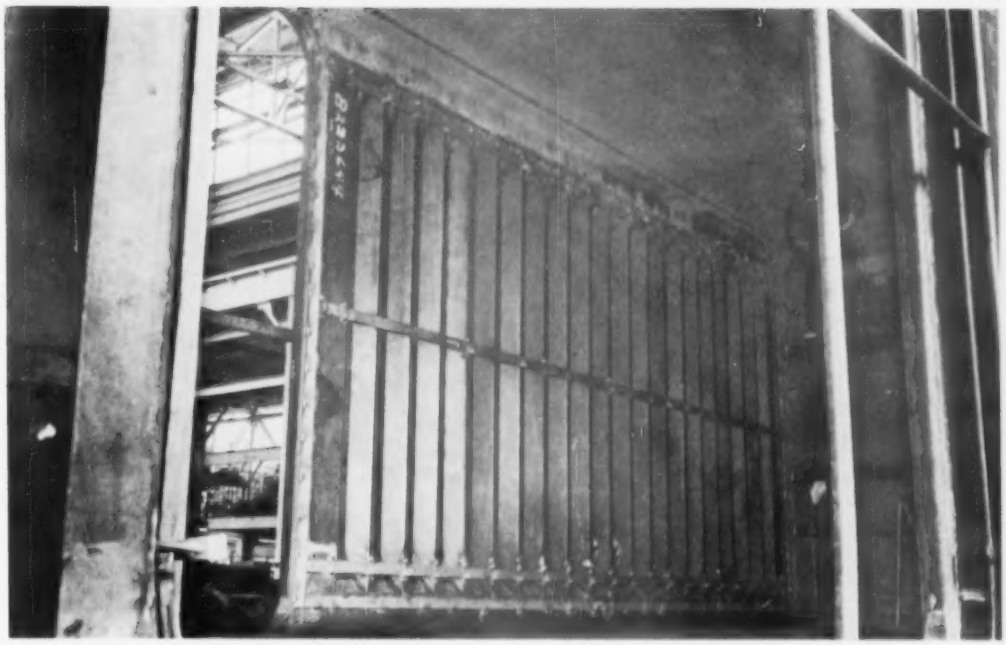
The cooling equipment is the standard Frigidaire railroad refrigeration unit with a couple of modifications. Both heating and cooling are provided. Heaters are incorporated in the evaporator area for both automatic defrosting and to heat the car when the outdoor temperature falls below the thermostat setting.

The automatic switch-over from cooling to heating works only when the car is set to maintain a temperature more than 20 deg. above zero. For commodities that are carried at temperatures lower than 20 above, no heat is needed because the colder they are kept the better.

The power plant is driven by a GM model 2-71 36-hp diesel engine driving a 17.5-kw alternator. The refrigeration equipment consists of a dual 5 hp compressor-condensor unit and a matched evaporator.

Unique Generator

An induction generator, the reverse of the common squirrel cage induction motor, is used in the refrigerating unit—the first time an induction generator has been used in any industry. With this induction alternator there are no slip rings, no brushes, no exciter and no voltage regulator. The only wearing parts are the sealed shaft bearings. Correction of the power factor is done by a group of capacitors.



The space between the inner and outer box is virtually a continuous duct for blowing the cooling air in its closed path. The air in the revenue space (i.e. that surrounding the lading) is circulated when necessary by three fans. These are mounted in the ceiling along with lights that can be furnished to eliminate the need for extension cords.

Induction motors are used throughout—the two 5-hp compressor motors, the two 1-hp blower motors that drive four blowers to circulate 5,000 cfm of coolant air in its closed path, and the three ⅛-hp motors that drive the fans in the roof of the lading compartment.

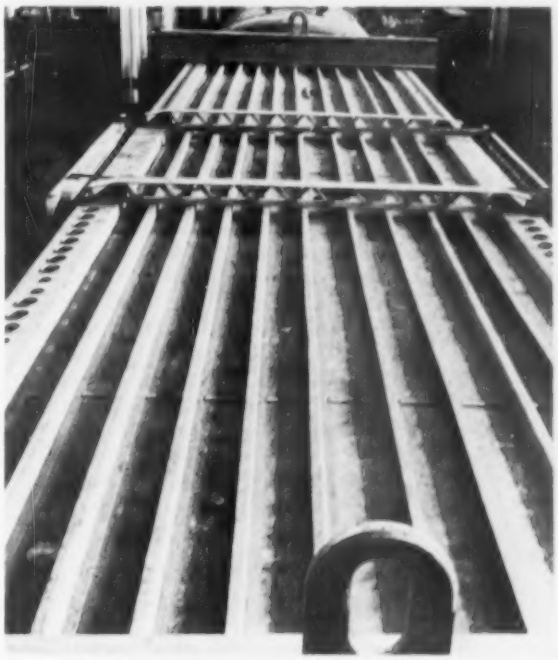
These three roof blowers are used to remove the heat from a hot load. When the car is in frozen food service their use is not required. In handling fresh produce, the fans are left on because the circulation aids in removing the heat generated by ripening.

The engine runs at three different speeds. Idling speed is 1,000 rpm, the normal operating speed 1,200 rpm. It is speeded up automatically to 1,400 rpm when the compressor cuts in. The engine normally runs continually, with temperature control attained by cutting loading and unloading the compressor. When the engine is shut down and has to be started, a hydraulic starter is included with both automatic and manual charging features. The latter is simply a hand-operated pump.

Capacity of the refrigerating unit varies from 2 to 9 tons. It is 2 tons when the box is near its minimum temperature setting of about 20 below zero—9 tons when box is hot and heat and transfer is at a maximum.

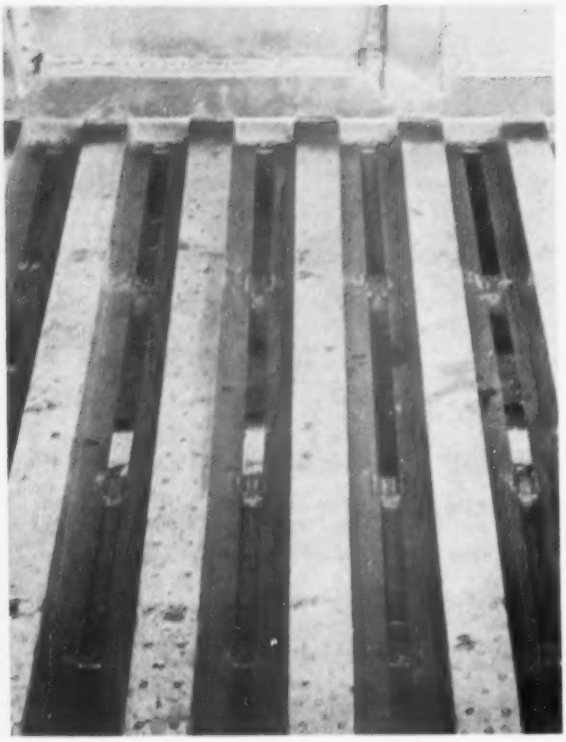
The cold wall principal is employed for several reasons: (1) Defrosting is required much less often and therefore less unnecessary heat is added which would require later removal; (2) less chance for the load to be dehydrated because the air around it never gets to the evaporator; (3) there is therefore less frost formed on the evaporator to reduce its efficiency of heat transfer; (4) with the large cooling surface of the walls, ends, ceiling and floor temperature differential can be small, and (5) the cold wall removes heat on the way into the car which EMD thinks is the place to do it.

All exposed steel within the car is covered with sprayed-on Neoprene or Epon enamel. This protects against all forms of corrosion and also permits the use of sulphur dioxide inside the carbody for ripening control.



A blower at the refrigerating end of the car sends the cool air between (and to some extent over) the longitudinal Z sections in the roof structure. In traversing the length of the roof most of the cool air peals off and proceeds down through the holes and between the inner and outer sides of the box; the remainder goes down a duct (3 in. deep by the width of the end) on the far end of the car. It returns to the blower along the entire width of the car underneath the flooring as shown in the section drawing.

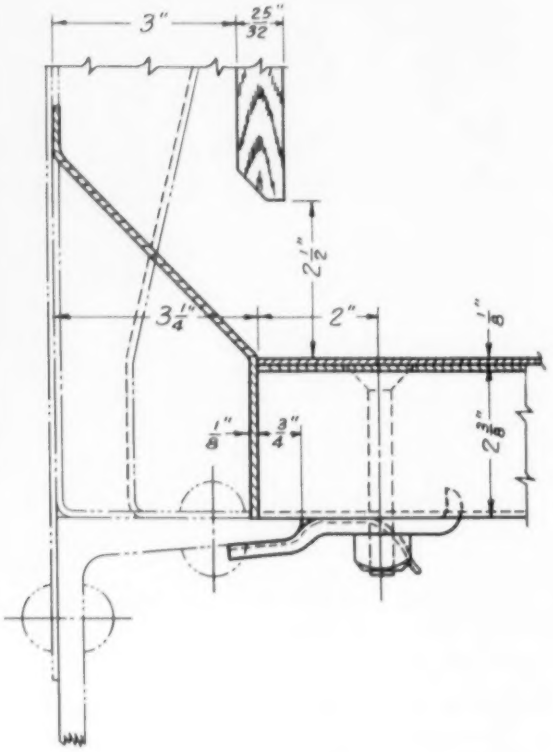
ACL Tries New Type Flooring – Its Purposes:



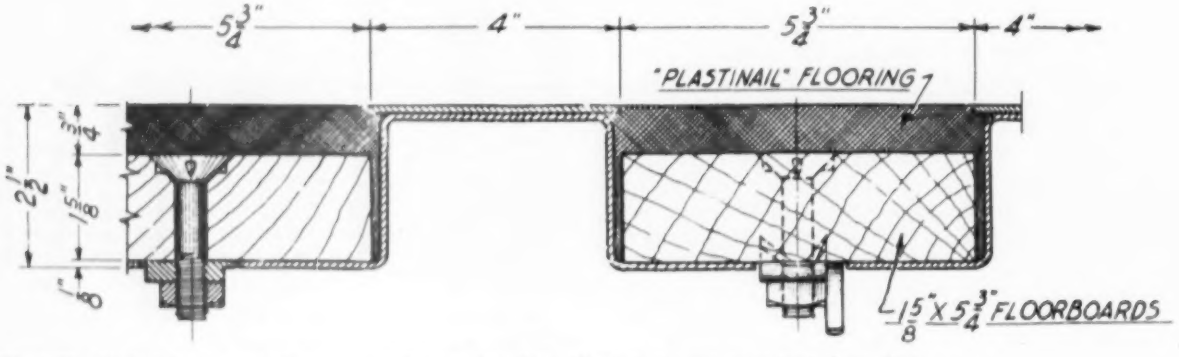
- To give nailable surface
- Impervious to oil and grease
- Smooth and watertight
- Reduce maintenance

The ACL has already equipped 100 box cars and before the end of this year expects to equip another 200 cars with a new type floor it has developed. The road has applied for a patent on this flooring. It consists of steel "hat" sections between which are wood fillers that are capped with an inorganic composition containing calcium chloride and known as "Plastinail." The consistency of the Plastinail is about like plaster when applied but hardens to form a nailable substance that will also resist abrasion.

The new floor, which has a nailing area 60% that of

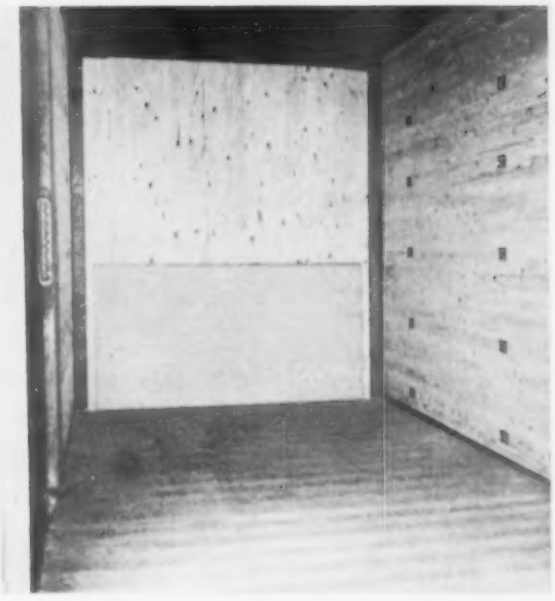


The hat sections are welded to each side of the center sill, to the stringers and to the grain strips.



Wood filler blocks take up most of the space between hat sections; Plastinail, the rest up to level of top plate.

The pouring and initial troweling take two men about 45 min. The car is moved and the final troweling done an hour later.



The completed car includes lading strap anchors and a plywood protective section on the lower part of each end.

an all-wood floor, is being applied during general repairs at the Waycross shops. The steel and wood portions of the flooring are put on at positions where other work involved in the general repair is done. The Plastinail is then applied at a separate station by three men—one to mix and two to spread it.

The first step in laying the new floor is to weld a 2″ x 2″ x ¼″ steel angle along each side of the entire length of the center sill to form an additional anchor for the steel-ribbed wood Plastinail flooring. Steel filler pieces are also welded to the bolster and crossbearer cover plates at center sill and floor stringer locations to form a continuous support for the steel floor hat sections. The metal grain strip that runs along each side is then fitted to the side posts and welded in place. The metal grain strip serves two functions—it makes a grain tight connection between the sides and floor of the car, and it helps to stiffen the car. The steel hat sections are then securely welded to the steel angles and steel filler pieces as well as to the floor supports and side sills in addition to welding the ends of the hat sections to the metal grain strips. The first hat sections to be applied are those at the door posts. Next come those between the door posts and the ends of the car. Last to go in are the hats between the door posts. The steel floor assembly will not only support heavily loaded fork lift trucks, but will also serve to strengthen the entire underframe of the car and make it more rigid.

The wood filler planks are put in place and bolted down with floor clips to the side sills, floor stringers, and the top angles at the center sill. Then wire mesh is attached to the top surface of the wood planks with divergent staples. This is done by a fourth man working part of each day and using a heavy rubber mallet and a Spot Nailer that has a notch in the nose to straddle the wire. Hitting the nailer with the mallet sinks and spreads the staple, securing the wire mesh in place.

It takes about 45 minutes to pour the Plastinail and do the preliminary troweling. The whole floor is done at the one time. The car is then moved forward while the crew applies the material to the next car in the line. By this time the Plastinail in the first car has taken its initial set and is given a second troweling. The final troweling is necessary to get a smooth surface and one that is impervious to oil and grease. The material sets hard in 1½ hours at 90 deg., but takes up to 4 hours at normal inside shop temperature during the winter.

The metal floor rib consists of a preshaped ⅛-in. thick steel plate hat section with a ⅛ x 4-in. galvanized steel plate spot welded along the top of the full length of the hat section. It is purchased as a complete assembly. The galvanized top plate overlaps the hat section ⅛ in. on each side to make a continuous perfectly flat floor when completed. The hat section does not do this because of the rounded corners at its top. The top plates also serve to strengthen the load-bearing portion of the floor and, because of the ⅛-in. overlap, help to hold part of the filler material in place.

The floor design as finally adopted and applied to the 100 cars was developed from two experimental installations. The first car on which this general idea was tried had half the floor with the present combination of the steel sections, wood fillers and Plastinail. The other half of the floor used only the hat sections and larger cross-section planking to fill in between them. The wood and steel flooring did not work out very well because it was impossible to get a smooth surface between the wood and steel floor ribs with the result that gaps and cracks allowed moisture, grain and dirt to collect.

The first car also had slightly different thicknesses of wood and Plastinail—$\frac{3}{4}$ in. and $\frac{5}{8}$ in. This was changed in the second car to $1\frac{5}{8}$ in. and $\frac{3}{4}$ in., and these dimensions were adopted as standard for the remaining cars. Although the floor assembly is being patented, there will be no royalty charges made against any railroad desiring to use this style flooring.

Mobile axle flaw detector permits the operator to make a rapid axle inspection. In the operator's field of vision are both the Reflectoscope search unit and the auxiliary viewing screen.

C & O Installing Fleet of Axle Flaw Detectors

Ultrasonic axle inspections are becoming routine mechanical operations at many terminals

Ultrasonic inspection is proving reliable in preventing freight car journal failures, judging by the experience of the Chesapeake & Ohio. After prolonged investigation and tests, C&O has installed a fleet of mobile axle flow detector units that are small motor vehicles carrying Sperry Reflectoscopes capable of testing without diassembly as many as 320 journals daily. Initial testing of 18,872 revenue freight cars of C&O and foreign ownership has disclosed 28 definitely cracked journals and 10 others with internal defects. C&O engineers say that any of these 38 potential failures could have caused a wreck.

The new C&O ultrasonic test program provides for regular use of the largest single installation of ultrasonic inspection equipment by any railroad. It developed from the determination of C&O management to apply technical knowledge to the development of tools and methods which effectively would reveal faulty journals in railway rolling stock and prevent such losses as the C&O experienced in a series of freight train wrecks in 1952. Investigation established that some wrecks were caused by broken journals and that these service failures were due to cracks that had existed previously.

Development of the program was made the responsibility of the C&O Mechanical Department. The objective was to devise an inspection method that was simultaneously practical, reliable and economical. Extensive research and investigation were projected and C&O's mechanical engineer, engineer of tests, and Sperry Rail Service participated.

Decision was made to investigate the possibilities of using the Sperry Reflectoscope, which is widely used for quality control, maintenance inspection and the testing of machine components without disassembly. It functions by beaming ultrasonic sound through metal, catching the echoes or reflections from even minute structural discontinuities and revealing their location and nature on a viewing screen. The capacity of the Reflectoscope permits metal parts as long as 108 ft to be tested for defects.

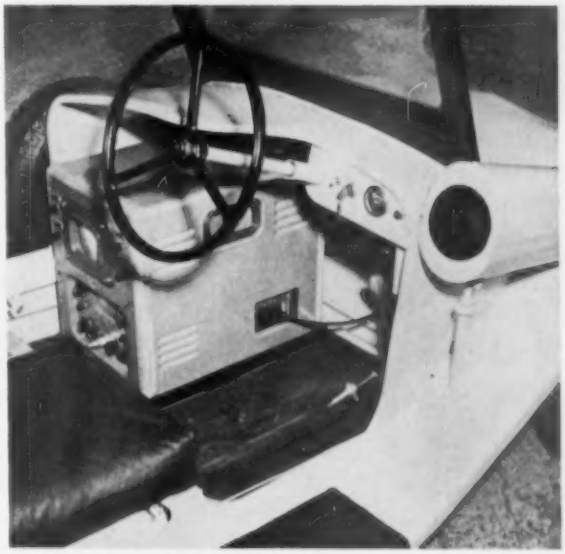
Preliminary investigation put the Sperry Reflectoscope to rigid tests. Large numbers of axles known to the engineering and tests departments to have cracks in journals and wheel seats were selected for testing. The journals and wheel seats were covered with tape, and both good and defective parts were mixed so that the investigators could not know which parts were defective or where defects might be located. Each axle was inspected by Reflectoscope and the indicated location of defects was marked on the tapes. Tapes were then removed and the location and nature of each crack verified by check against the records. This cross-check established that the

Reflectoscope accurately had located and measured every crack.

While these tests proved the ability of the Reflectoscope for indicating, locating and measuring structural discontinuities, the investigation proceeded to seek the answer to an important question: How would the Reflectoscope function with journal bearing, dust guards or sides of boxes in place? Wheels were mounted on axles with known defects and placed in truck side frames. The Reflectoscope identified the cracked journals among the four wheel sets tested showing that defective parts could be located even in complete assemblies. The complete truck presented no problem.

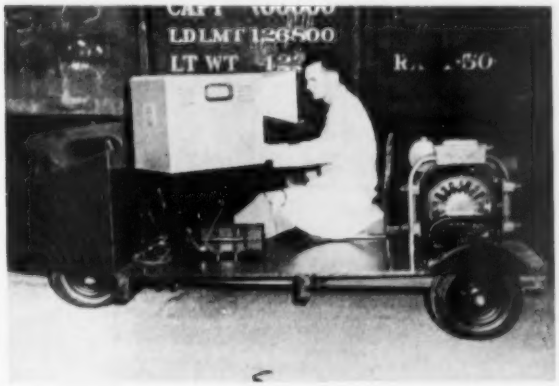
The investigation then went on to find how the Reflectoscope would function if there was a cracked journal under a freight car. Unknown to the investigators, the C&O engineer of tests had an axle with a cracked journal mounted with two wheels. The assembled unit was placed in a truck under a revenue freight car. The car was put in a line of cars, and the Reflectoscope picked out the cracked journal and even located and indicated the nature and extent of its defects.

Having established the effectiveness of the Reflectoscope, the program turned to the development of convenient and economical methods for testing freight car journals in yards with axles in place. It was decided that the Reflectoscope could be mounted on a self-propelled mobile carrier equipped with a portable, engine-driven generator furnishing current to operate the instrument.



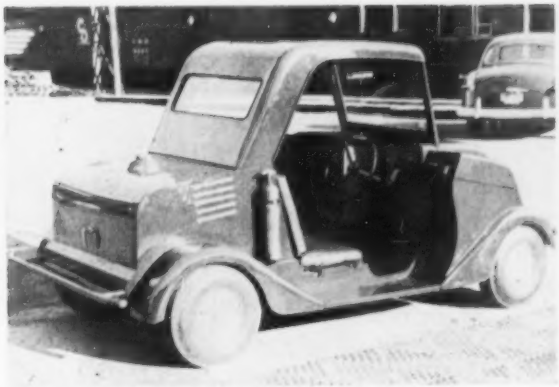
Reflectoscope is well protected by floor mounting and streamlined cowl. Seat can be adjusted to the side if necessary to bring operator closer to the journal.

Evolution of Mobile Axle Flaw Detectors . . .



1. Progressed from woden mock-up . . .

2. Through first model built on commercial chassis . . .



3. To the first with the auxiliary viewing screen . . .

4. To today's streamlined unit.

Study of the problem and testing of various designs finally developed the current version of the mobile detector which seats operator so that he can drive the unit and inspect journals in minimum time.

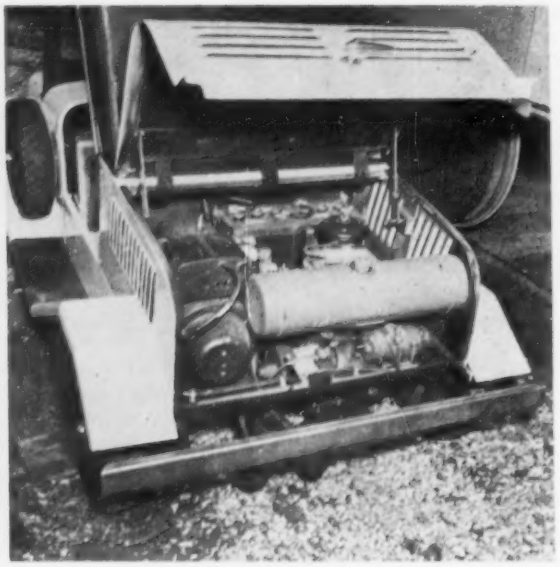
Many problems were encountered. The mobile carrier had to be built close to the ground so that the operator could reach the ends of car journals with the Reflectoscope search unit without leaving his seat. The carrier had to be easily maneuvered. The operator's seat had to be adjustable sidewise so that he could drive the car with the seat pulled out when journals were at distances from the runway.

In order to solve these problems, it was decided to construct a wooden, power-driven mockup equipped with electric generator and Reflectoscope. This prototype facilitated practical tests of the operation. Within ten days the unit revealed a defective journal in a revenue freight car. Removal of the wheels verified the existence of a long, circumferential crack.

The successful use of the mockup demonstrated the need for a more compact carrier. Search for a motor-driven chassis which could be revamped to meet requirements led to a chassis produced by King Midget Automobile Co., of Athens, Ohio. It was low, the drive engine was in the rear and design changes could be made without disturbing the drive mechanism.

This first standard mobile Reflectoscope carrier went into service at Columbus, Ohio. Within eight days it located a cracked axle. On the strength of its satisfactory service, construction of two additional carriers was begun. Upon completion in December 1954, one was assigned to Newport News, Va., and the other to Columbus. A fourth was constructed and assigned to Newport News in June 1955.

Operating experience with these carriers indicated the need for more changes. Location of the Reflectoscope on the front hood required the operator to look first at the journal when placing the search unit and then back at the Reflectoscope viewing screen. One of the mobile

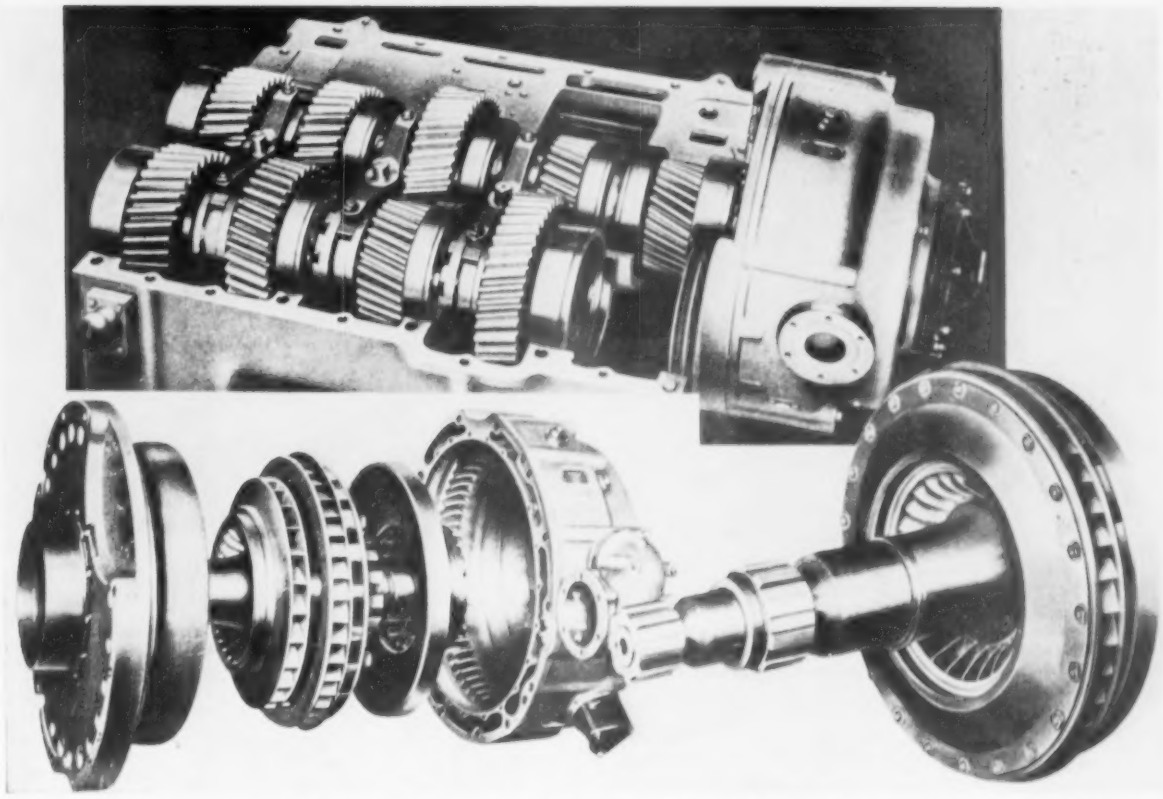


Two gasoline engines are installed at the rear of the car. One drives the wheels and the other drives a generator suppyling power to the Reflectoscope. Gas tank and battery are also fitted in.

carriers at Columbus was selected for further improvement. The frame was lengthened to provide more leg room. The Reflectoscope was shifted to a protected position on the floor. Sperry Rail Service developed and adapted an auxiliary viewing screen to be mounted on the right front fender directly in the operator's line of vision. The vehicle was streamlined for better appearance and utility.

Continuing improvements were made with the cooperation of the C&O, Sperry Rail Service and the vehicle manufacturer. The Reflectoscope was given the added protection of an extended cowl. The auxiliary screen on the fender was hooded for better visibility and streamlined for appearance. The seat was given sidewise adjustments so that the operator can easily reach any journal. These changes make is possible for the operator to apply the Reflectoscope search unit to the journal while keeping his eyes on the auxiliary viewing screen. The vehicle, low-hung and compact, easily travels beside repair tracks. Six more mobile axle flaw detector units, each equipped with a Sperry Reflectoscope, were delivered at Huntington, W. Va., in mid-June 1955. The fleet went into full-time service July 25th, with two in operation at Walbridge, Ohio, and single cars assigned to C&O yards at Stevens and Russell, Ky., and at Grand Rapids and Saginaw, Mich.

Six mobile detectors were delivered and went into service at four C&O terminals in July. With these, and those previously installed, C&O is said to be largest railroad Reflectoscope owner.



Mekydro Type K104 transmission with the upper portion of housing removed. This model is capable of transmitting 1,000 hp. Below is an exploded view of the hydraulic portion of the transmission. At the lower right are the pump wheel and turbine wheel of this disengaging converter.

Army Transportation Corps Shows U.S. . . .

What Mekydro Torque Converter Can Do

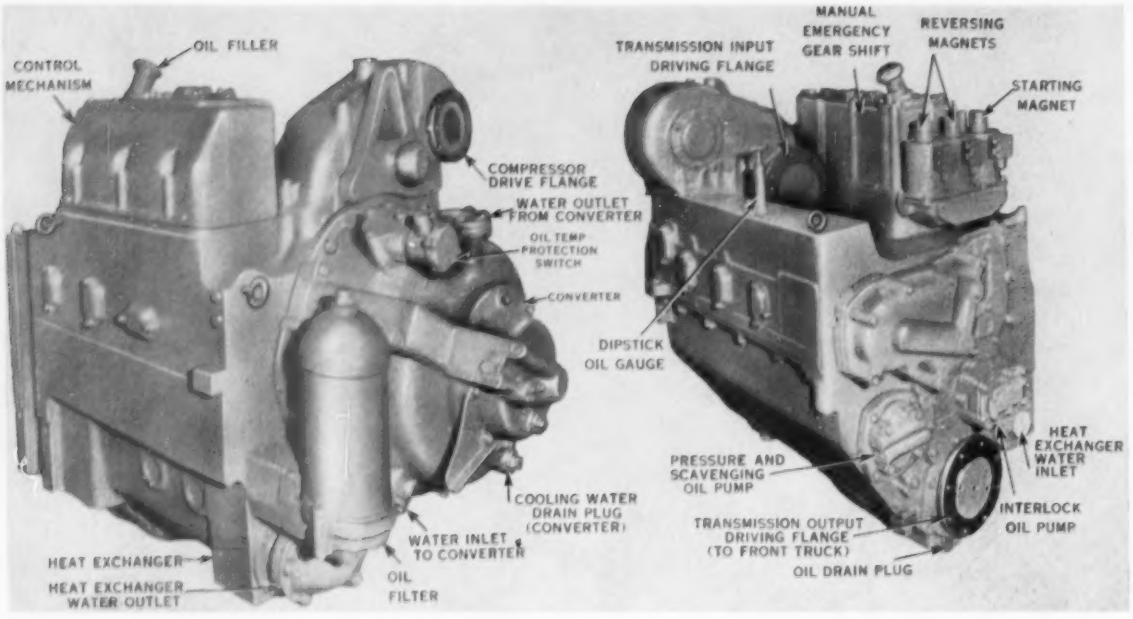
Baldwin-Lima-Hamilton builds GI diesel locomotive which will soon be followed by diesel-mechanical passenger units for the New Haven and New York Central light-weight trains

A 52-ton switching locomotive now working around the plant of the Baldwin-Lima-Hamilton Corporation at Eddystone, Pa., is driven through the same type of torque converter which will drive the high-speed locomotives that Baldwin is building for the lightweight Pullman-built trains of the New Haven and New York Central. The Mekydro torque converter was developed by Mayback of Germany, and Baldwin is licensed to manufacture and sell it in the United States. The high-speed locomotives will have a light-weight German-built diesel engine instead of the Caterpillar D-397 used on this recently completed Army switcher, which is numbered 1231.

At the same time that Baldwin was delivering the 1231, W. J. Harlow, general mechanical superintendent of the New Haven, was completing a trip to Europe and he has now submitted a report on German diesels to Harvey E. Hales, the New Haven's chief mechanical officer. It says that the diesel engine with mechanical transmission has been used with great success on the German Federal Railways. Many locomotives rated at 2,000 hp with a 1,000 hp diesel engine and mechanical transmission directly mounted on each truck are in service. Engines produced by Damlier, Benz, M.A.N. and Fiat for the German Federal Railways are all interchangeable. German standardization has been achieved not only in engines, but also in transmissions and related equipment. Mr. Harlow stated that "mechanical drive is here and it would be well for America to recognize it."

Army Switcher Is a Lightweight

United States Army's quest for a lighter weight locomo-

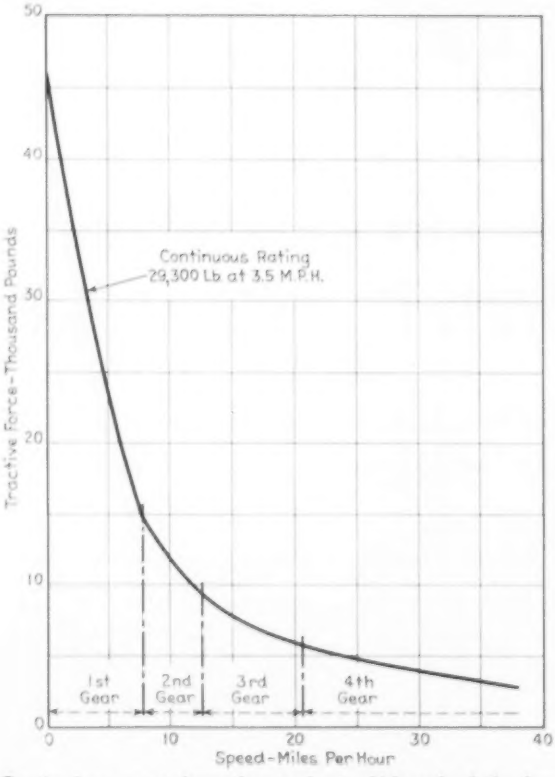


Mekydro multi-speed mechanical-hydraulic transmission as seen from opposite sides. Three sizes of this unit are made with the largest capable of transmitting 1,000 hp. The operation and appearance of each is the same as the one shown which was used on the 900-hp Transportation Corps switcher. The unit permits multiple-unit operation.

tive having a transmission which needs less strategic material and fewer skilled maintenance men than the diesel electric resulted in Baldwin's first installation of the Mekydro drive. While the Mekydro torque converter is completely German in origin, the method of applying its output power to the axles of this locomotive is primarily American. German practice is to deliver power to the axles through helical bevel gearing. This means that dropping an axle requires extensive disassembly of the gear box and drive shafts. Army specifications called for an arrangement which would permit the axle to be dropped out of the axle drive unit with the same ease that it would be removed from an electric traction motor. This requirement has been satisfied by a new Baldwin-Maybach design which even uses Westinghouse pinion and bull gears and regular traction motor support bearings.

This torque-converter locomotive is nearly the same as the Army's standard 60-ton 400-hp overseas standard and broad gauge diesel electric locomotive—a model which Baldwin has previously built in large numbers. The 1281 was designed to incorporate the same operating features including adjustable wheel spacing, multiple unit operation with all other overseas locomotives, light axle loading, restrictive clearance, and service in a wide range of ambient air temperatures. This new locomotive is 8½ tons lighter than the previous Baldwin-built GI diesel electrics not only because of the torque converter, but also because of a smaller fuel tank and extensive use of aluminum throughout the locomotive.

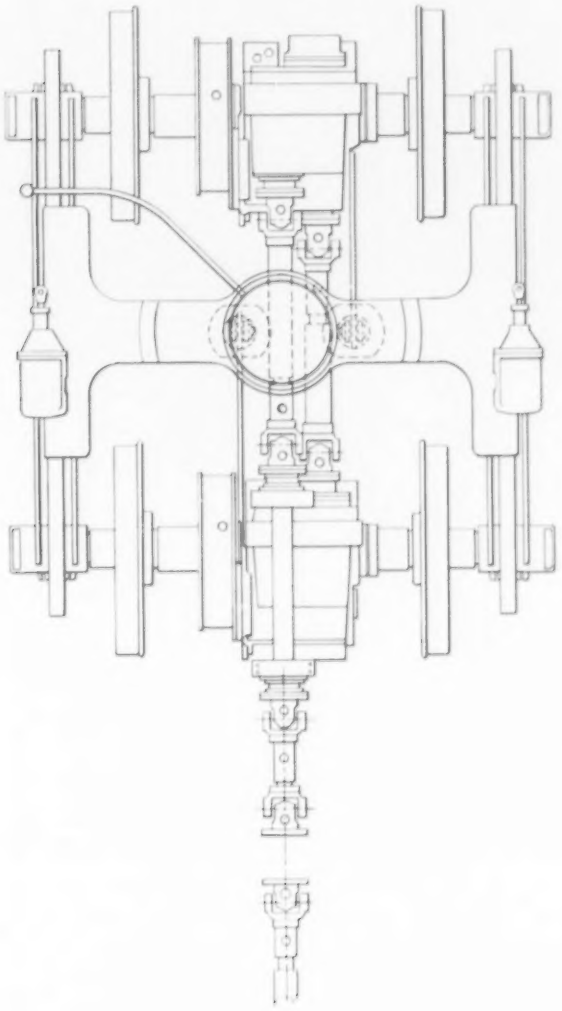
Above its welded steel frame this locomotive is arranged much the same as a diesel electric. The principal difference is that the Mekydro unit takes the place of the main generator. All the auxiliaries are about the same—air compressor, auxiliary generator, radiator and fans. The electrical cabinet is greatly simplified, but the diesel engine is fitted with two electric starting motors. The Mekydro unit does not require a load regulator and so the Woodward UG-8 governor is only arranged to control the admission of fuel to the diesel engine.



Tractive-force curve shows the speeds at which each of the four gear combinations drives the locomotive. Mekydro characteristics permit smooth gear shifting. This transmission has a continuous speed about one-tenth that of the maximum speed.

The 350-gal. fuel tank and a 64-volt battery are located

below the locomotive frame. In addition, there are a series of shafts, couplings, universal joints and pillow blocks necessary to transmit the power from the Mekydro torque converter to the axles. To allow this locomotive to traverse a 75-ft radius curve, it was necessary to couple the primary output shafts to the axle drive units on the outer axles at each end and then have secondary power shafts drive back to the inner axle on each truck. The primary drive shaft passes through an opening in the body center plate assembly and the secondary shaft passes through a hole in the truck bolster. A torque reaction member extends from the axle drive unit to the bolster and is secured by a cushioned link. This has same function as the spring nose suspension of the electric traction motor.



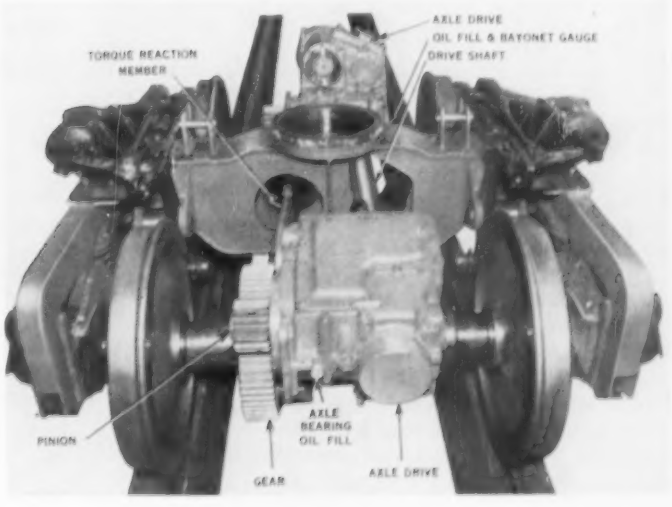
Mekydro for Locomotive Service

The Transportation Corps announcement concerning their diesel-mechanical locomotive states that the decision to use the Maybach Mekydro transmission "was based on an extensive investigation and engineering study which

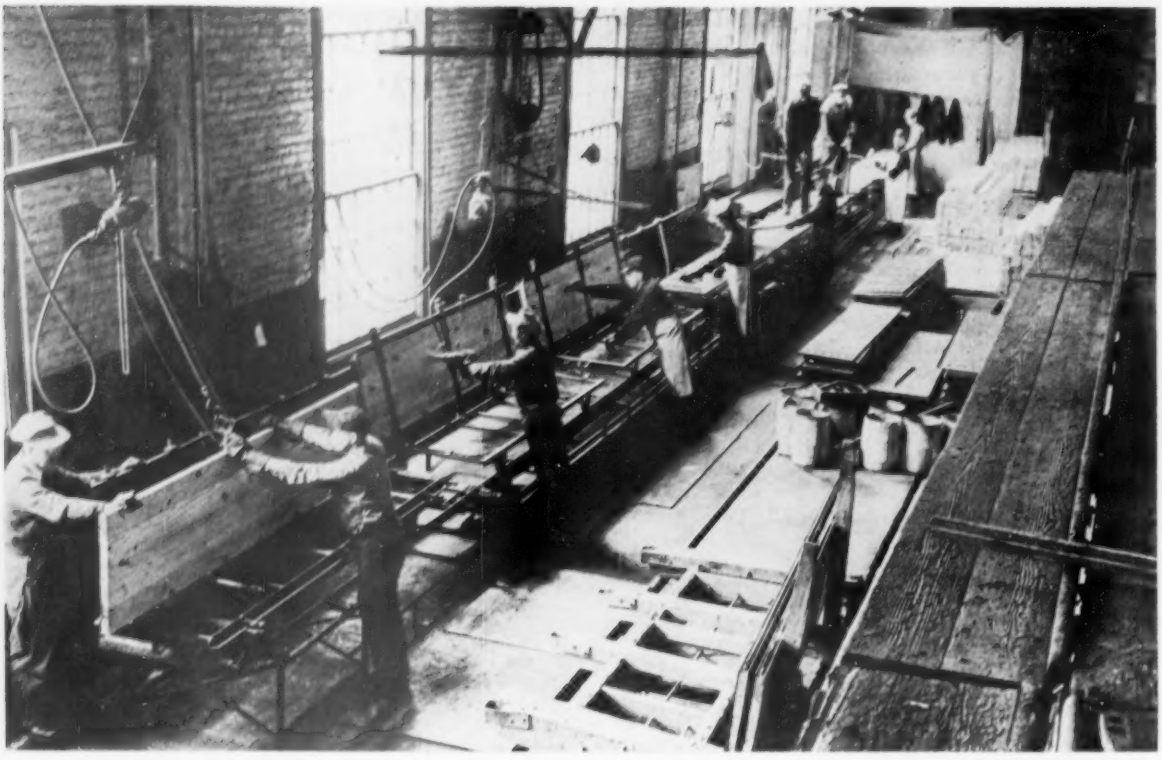
(Continued on page 87)

Locomotive Characteristics

Type	0-4-4-0 (BB)
Horsepower for Traction	400
Gauge (Adjustable), In.	56½, 60, 63, 66
Weight in Working Order, Lb.	104,000
Length Inside Pulling Faces, Ft-In.	40-5
Truck Wheelbase, Ft-In.	6-11
Overall Width, Ft-In.	9-6
Overall Height, Ft-In.	13-4⅛
Wheel Diameter, In.	40
Engine:	
Manufacturer	Caterpillar
Type	4 Cycle Vee
Cylinders	12
Bore and Stroke, In.	5¾ × 8
Brake Horsepower	500 @ 1,200 RPM
Idling Speed—RPM	450
Weight, Lb.	12,100
Transmission:	
Oil Capacity, Gal.	22
Weight, Lb.	3,450
Gearing	17 to 63
Maximum Speed, Mph	35
Contenious Speed, Mph	35



Axle drive on four-wheel truck of army switcher viewed from the center of the locomotive. Input shaft passes over the center plate to the drive unit on the axle at the far end and then a secondary shaft comes back through the bolster to the inner axle drive unit. Illustration right shows the axle-drive gear case removed. Wheels can be respaced out to 66-in. on this truck.



Half the cars get Nailable Steel Floor, the other half wood floors with steel plate pre-assembled into panels. The latter operation is done on an assembly-line basis at the stations shown.

Two Features Distinguish New GN Car Shop

1—The Way Cars Are Built

2—The Unique Welding Layout

Cars are built different up on the Great Northern—in the new shop building at St. Cloud, the men assemble the body along one side, the underframe along the other, and the trucks in the middle. The underframe is then hoisted on the trucks, and the body is placed on the underframe. This completes the basic car, although a number of finishing operations remain on both the inside and outside (floor, lining, brake rods, etc.).

The principal reason the GN builds cars like this is that the body can be supported on low dollies rather than trucks. Thus, working heights are lower, and the men can do about half the work without scaffolding.

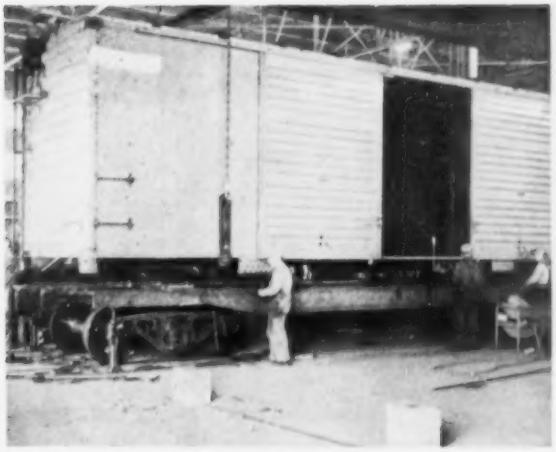
The overall building of the cars can be considered as divided into the five parts shown on the diagram—underframe parts, center sills, trucks, bodies and final car work. Details of these operations are covered in two of the accompanying boxes.

Flexible Welding Layout

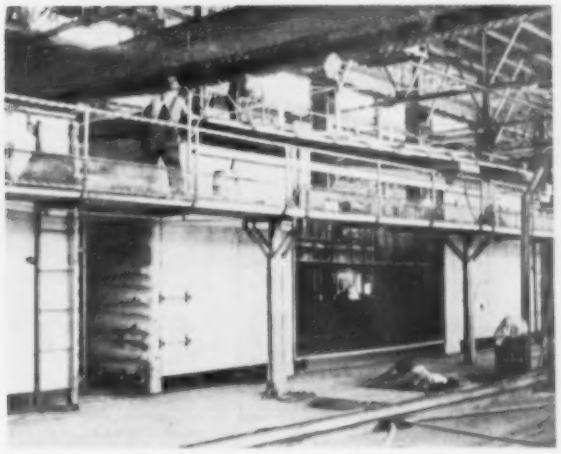
Heart of the welding layout is a group of 24 welding panels scattered throughout the shop. Each panel provides up to five outlets for plugging in electrode cables. There are also 26 floor outlets of two receptacles each, 22 well and 12 wall outlets of two to four receptacles each. Current is supplied to all these receptacles by welding machines located above the panels on steel platforms attached to main building columns.

Plans are underway to put lights over each receptacle to show whether a welding machine was in use, and whether the welder forgot to pull his plug out. These lights would also caution the welder against pulling his plug out underload, causing an arc from currents up to 125 amp.

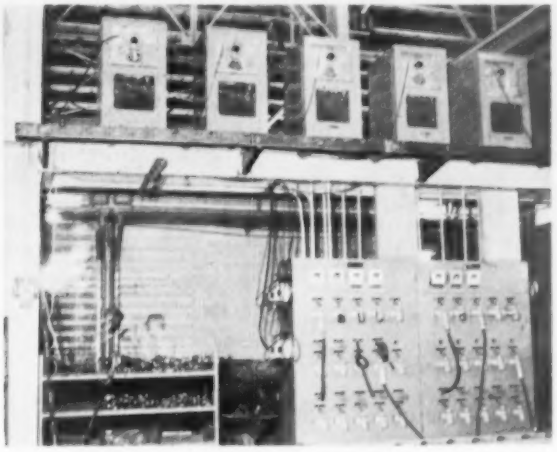
The welding stations are connected to the floor, well



Instead of attaching the sides, ends and roof individually to the underframe, the entire body is assembled separately and lifted in place. Among the advantages of building a car this way is that . . .



The body can be supported on low dollies instead of trucks, giving a lower working height and letting one do half the work without scaffolding

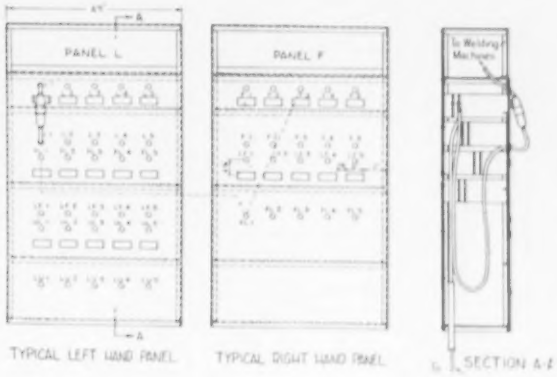


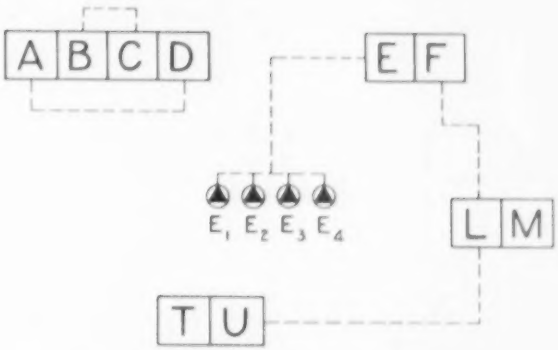
FEATURES OF WELDING LAYOUT INCLUDE:

- All welding machines and most cable off the floor
- Receptacles within a few feet of any point in the shop
- No accidental overloading as only one outlet per welding machine. Yet complete flexibility because of . . .
- A simple, easy-to-make method of interconnecting selected panels so that a welding machine at one location can supply current to a point a hundred or more feet away through a series of underfloor cables.

and wall outlets by permanently connected under-floor cable. Selected panels are also interconnected with other panels so that if no welding machine is available to supply current to a particular panel, a connection can be made at that station panel to utilize current from a welding machine at a remote station.

To weld at a given panel, (L is shown in the example in one of the illustrations), there are five welding machines, and five outlets. The first five men who want to weld from panel L merely plug into a receptacle direct-connected to one of the five welding machines at L. But if a sixth man wants to weld from L, all the outlets will be taken. Yet he can still draw his power from the panel at L without having to string electrode cable along the shop floor all the way to the nearest unoccupied welding machine. Instead, the sixth welder merely plugs his electrode cable into an extra outlet on panel L (FL-1 shown)

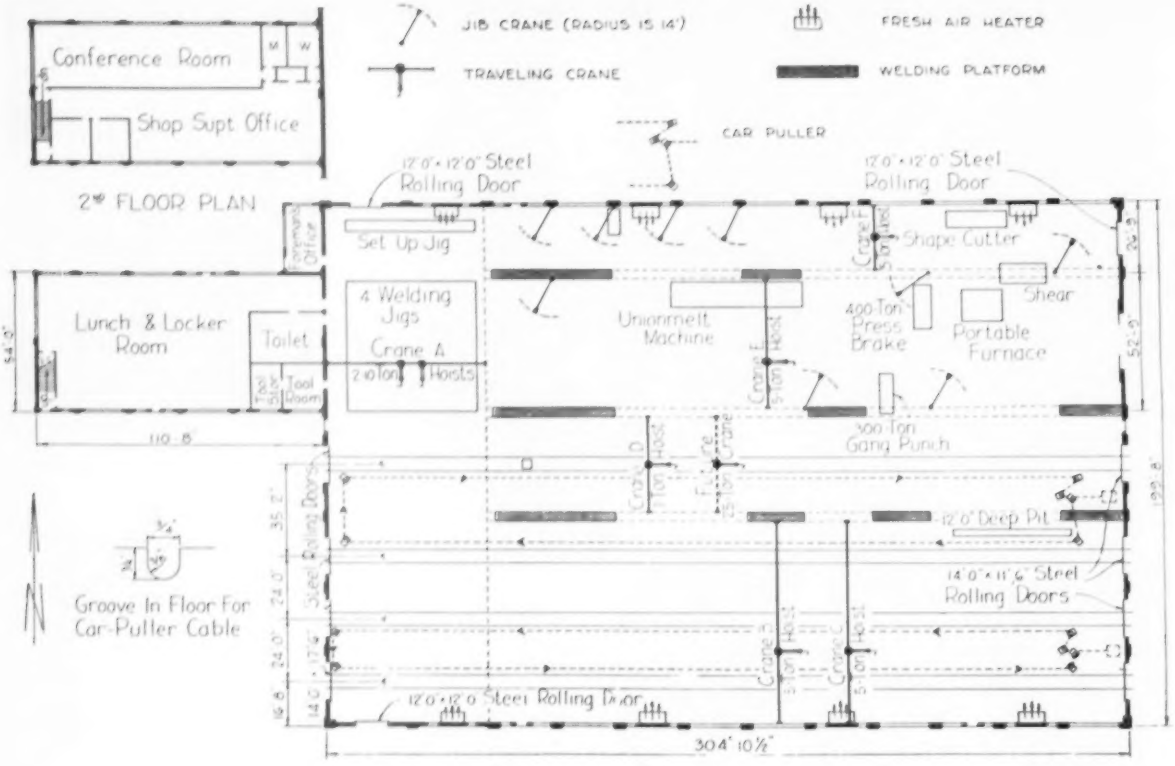




Flexibility in welding—To weld from Panel L with current furnished by a machine at F, the electrode cable is plugged into receptacle FL-1 on Panel L. This is permanently connected by an underfloor cable to FL-1 on Panel F. This end of the connecting cable is a plug, which is inserted into any available welding machine outlet (F-3 shown), and welder 3 at Panel F now supplies outlet FL-1 at L. The LU and UL designations on Panel L indicate a similar tie-in to Panel U.

and hooks up the inter-connection at the remote station (FL-1 to F-3 on panel F is shown) which has the available welding machine that will furnish him current from panel L.

This interconnection FL is merely a cable permanently mounted under the floor with a receptacle at one panel



Underframes are made in the upper, or north, half of the shop. Generally speaking, the center sills are made in the lower portion of this section, other underframe parts in the upper part. There is some overlapping, however, e.g., the gang punch handles both the center sill and other underframe components. The two are tackwelded together on the set-up jig, finish welded on one of four rotating jigs.

The center sill is assembled from right to left in a straight line except for a jog to go through the Unionmelt machine. Movement along the last third of the line is by roller conveyor, straddling which is a drill press that bores out the holes for the draft gear carrying strap. Several interesting jigs shown in the illustrations are used along this line. Division of work on the underframe parts between the different pieces of machinery is as follows:

Shapecutter:
- **Cuts side sills**

17-ft Shear:
- **Cut top and bottom cover plates for body bolster**
- **Cut cross bearer tie plates**
- **Cut cross bearer top and bottom plates**
- **Cut side bearing stiffeners**
- **Cut center sill faces**
- **Cut AB brake fastenings**
- **Cut sole plates**
- **Cut rod carriers**
- **Cut lever carriers**

400-ton press:
- **Bend (cold) sole plates**
- **Bend bottom bolster cover plates**
- **Bend cylinder brackets and valve brackets**

200-ton punch:
- **Punch end sills and Z-bar stringers**
- **Punch top cover plates, cylinder brackets and valve brackets**

300-ton punch and shears:
- **Punch center sills, end sills, side sills and sole plates**
- **Punch bolster bottom cover plates, bolster web plates, crosstie web plates, crosstie bottom and top plates**
- **Nibble out for cylinder brackets**

Drill press:
- **Bore holes in center sill for draft gear carrying strap**

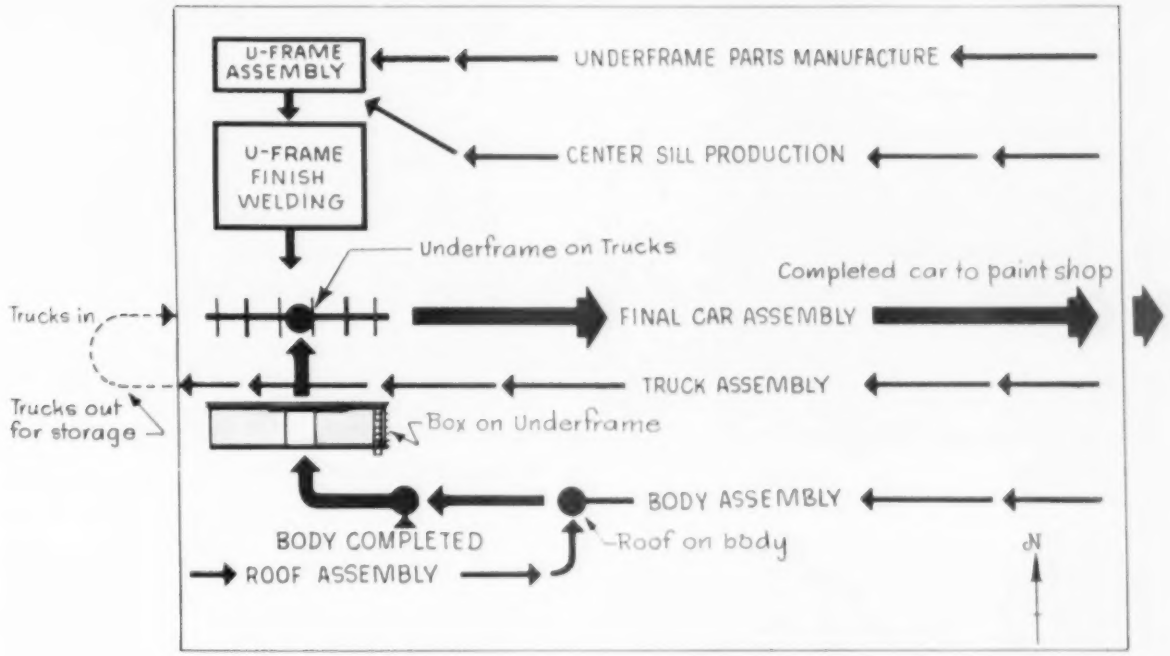
Diaphragm fabrication jigs:
- **Weld center braces, striking castings, center sill spacers and lever carriers**

There is also a space below the portable furnace (not used in this program) to prefabricate slack adjuster weld couplings and angle cock brackets, a ladder jig in the blacksmith shop, and several jigs for manufacturing major underframe components like body bolsters and crossties.

end (the panel near the welding operation to be performed) and a plug on the end at the second, or remote panel, from which the current will be furnished.

This simple system of designating plugs and receptacles is one key to the success of the layout. The order of the letters tells which the symbol indicates—plug or receptacle. Where the panel letter appears first (FL on panel F), it indicates a plug. Where it appears last (FL on panel L), it indicates a receptacle.

Thus, the welder can take advantage of the system's



HERE'S HOW IT'S DONE—Center sills and parts that go on it (bolsters, cross-bearers, end and side sills, etc.) are made along north side of shop, and the underframe assembled in northwest corner. Bodies are made along other side, with roofs put on halfway down the line. In the middle of the shop the underframe is put on the trucks and the completed body on the underframe. Finishing steel jobs are done as the cars proceed eastward and out of the shop for painting and lumber work (side and end linings, routing boards, etc.).

Roofs are built at three stations along what is the lowest track in the diagram, beginning at the left. The first station is a jig for assembling the parts, the next two for riveting. Roofs are stored waiting for application directly below the location on the next track where they are applied to the body.

There are six positions on the body assembly track. In the first, the sides and ends are erected and held in place by a couple of braces for temporary joining by fit-up bolts. The sides and ends are riveted together in the second position, and the ladders applied. The roof is put on at the third station, fitted at the fourth and riveted to the body at the fifth. The sixth position is for storage (more is available on the extension of this track outside the building). Movements along this track are with the car supported on special low dollies.

The trucks are built along the next track, and they, the body and the underframe (built in the upper, or north side of the shop) are brought together on a track running through the approximate center of the building. Five more stations complete the work done on the car in this building—two for fitting and welding, one for air brake work, one for applying doors and brake rods and the last for adjusting side bearings and inspecting the car. A 216-ft pit runs under the last five stations on this track. Remaining work on the cars is done either outdoors or in an adjoining building known as the wood car shop.

Movement along the different lines is by car-puller cables arranged in two endless-type systems, each serving two tracks and operating in opposite directions

flexibility by remembering only three things. First, he looks for an empty direct outlet from a welder in the top row of receptacles (L-1 to L-5). If these are all in use, he plugs into one of the second row (FL-1 to FL-5), say FL-1. Next he goes to F panel and locates the other end of the cable by finding the *plug* with the same designation. Finally, he takes plug FL-1 and inserts it into any empty welding machine outlet at F (F-3 is shown). He is then drawing welding current from the third welding machine on F panel through an outlet on L panel with no more external cable than if the current were coming from L.

Additional Flexibility

If all machines at F are in use, power can be taken from U in the same manner. The double tie-in on L (to U and to F) serves another purpose. If a man wishes to weld from U, but finds all machines at U and at L are in use, he can connect U to F through L and thus get his current from two panels away instead of one. The double jump requires but four steps:

1—Plug electrode holder into LU-1 on U panel (or LU-2, LU-3, etc.)

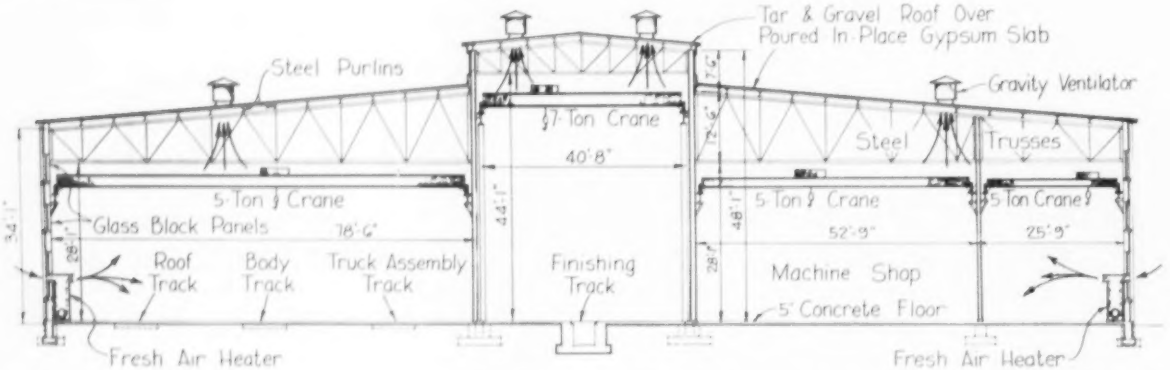
2—Take plug LU-1 on L panel and put it in an FL receptacle, say FL-4.

3—Plug FL-4 on F-panel into any machine available at F.

4—Start the machine, making current from F available at U.

Additional sources of welding current for the spaces in-between the 24 panels are provided by 26 floor outlets of two receptacles each, 22 well and 12 wall outlets of two to four receptacles each. Some panels have an extra five plugs each for the in-between receptacles. T is

Heavy materials (steel plates of all sizes, side-sill channels, center-sill Z-sections, etc.) are stored outdoors east of the shop and are moved into the shop at night on the 175-ft extension of the crane runway



Ventilation is combined with heating in a pressure-type system. Fresh air is drawn in through louvers in sidewalls by four individual units located at intervals along each wall. The air is heated as necessary by the units, then blown out into the shop area. Exhaust is through gravity-type ventilators in roof.

one such panel, and the extra plugs on it are numbered T21 to T25.

When a man wants to weld from floor receptacle T-25, he plugs his electrode holder into that receptacle. Going to T-panel, he takes plug T-25 and inserts it into one of the welding machine outlets (T-1 to T-5), the same way that plug L-1 was put in receptacle L-1. If all machines at T are in use, T-25 would be plugged into one of the interconnection receptacles (an MT designation), and the same procedure followed for remote power supply as was done between L and F.

The number of direct interconnections can be approximately doubled by taking advantage of the cable length. This is about 5 ft, or long enough to plug into receptacles on the adjoining panel (E to F, L to M, T to U, etc.). Therefore, each panel has the interconnection for which it is wired directly plus the one to which the panel next to it connects.

One Group Isolated

The one exception to the interconnections described above is panel group A, B, C and D. A and D, and B and C are joined, but none of the four connect with any other location. These panels supply current solely for tacking and finish welding the underframe.

The Shop Is Well Equipped

The shop—which has a working area 200 by 305 ft and a 54 by 110 ft extension on one side for locker room and office space—provides four through tracks with openings in the end walls fitted with motor-driven overhead rolling steel doors. One of the tracks is served by a pit 260 ft long for underside work on completed cars. Six overhead traveling cranes have been installed to serve various areas of the shop. In addition, 2-ton capacity jib cranes with 14-ft radius are mounted on building columns at strategic points around the machine shop area.
overhead travelling cranes have been installed to serve

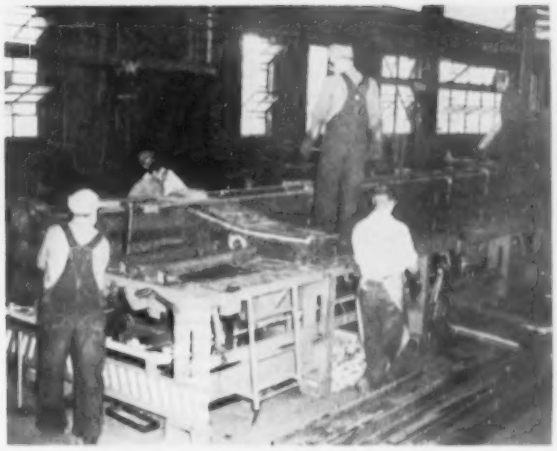
One of the travelling cranes extends 175 ft east of the shop into the outdoor storage area where the GN keeps all sizes of steel plates, heavy channels, Z-sections for center sills and other heavy material. Movement of all this material into the shop is by the travelling crane, and it is done at night so that the men do not have to clear the area under the path of the crane with its heavy load.

The floor of the shop is a 5½-in. reinforced-concrete slab, coated with a hardening agent. Sleeves of 8-in. pipe have been placed in the concrete floor along each side of the shop tracks to hold the legs of the portable scaffolding used in working on the tops and upper sides of cars. The pipe sleeves are placed flush with the floor 7 ft 8 in. from the center line of the tracks at 18-ft intervals.

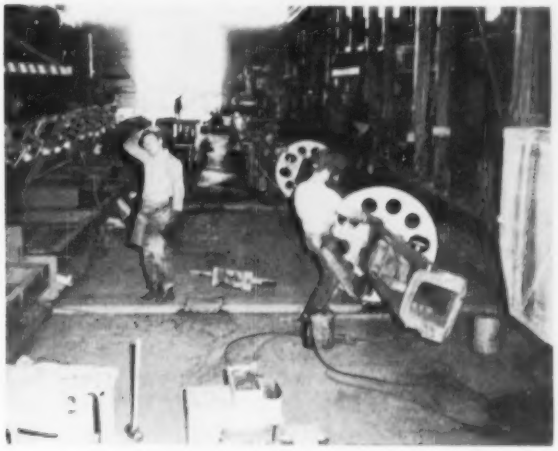
Two Car Puller Systems

Movement of cars, unmounted bodies, roofs and trucks

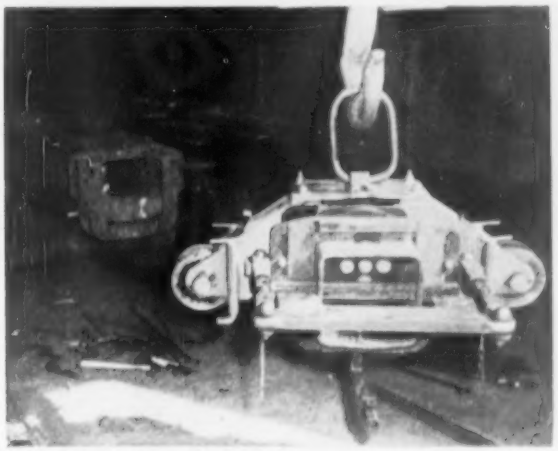
Typical of the specialized jigs for many operations is this positioner for welding the side bearing wedges on the bottom bolster cover plate



After the center sill is completed, it is placed in the set-up jig along with the crossbearers, body bolsters, stringers, end and side sills, etc. These are tack welded together in this jib . . .



After the two Z-sections are welded together in the jig at the left, the center sill is rolled to the right so that cover plates and other parts (center braces, striker castings, spacers and brake lever carriers) may be welded on downhand. It is then transferred to the roller conveyor a little further to the right. Two more operations complete the sill—drilling the holes for the draft gear carrying strap and applying the draft gear



Then a "spinner" like this is inserted in each end of the tacked underframe structure to allow it to revolve about its own axis for downhand welding after it is moved to one of four adjoining welding jigs where welding is completed. On the spinner, the large plate goes through the draft gear slot, the smaller bar through the striker. The bottom clamp goes under the striker, and the spinner is tightened in place by turnbuckles

is by two winch-type car pullers, at the east end of the shop, each serving one of the two pairs of tracks. The car-puller systems are endless, the cables being run from the winches through pulleys located at the opposite end of the shop then back to the winches again. The endless cable moves in one direction for the north track of each pair, the other direction for the south track.

Thus, the roofs move one way, the body the other, on the south pair of tracks until the two are joined and proceed together down the body track.

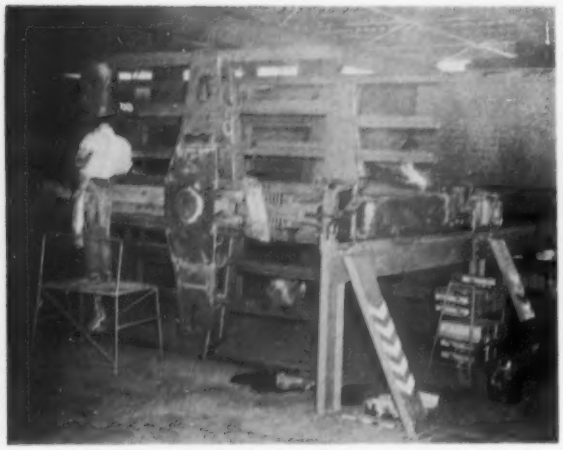
The same is true for the trucks and assembled car on the north pair of tracks served by the pulling system. A groove is provided in the floor to accommodate the cables so that they do not interfere with work alongside the tracks.

Pressure Heating System

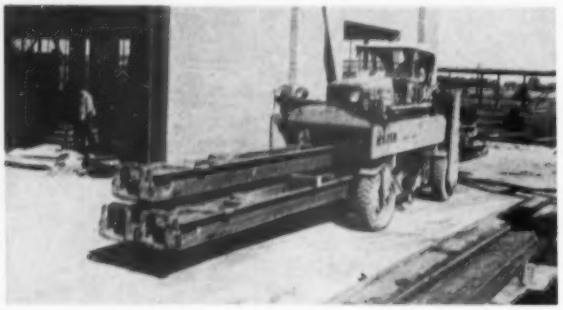
Heating in the main shop is combined with ventilation in a pressure-type system. The system incorporates fresh-air heaters, located four along each side wall. The fresh air heaters are equipped with fans and steam heating coils. They draw in fresh air through louvered intakes in the side walls, heat the air, then blow it out into the shop area through outlets located about 8 ft above the floor. The heated fresh air circulates throughout the shop area, thence is exhausted through gravity-type ventilation in the roof.

One of the strongest impressions a visitor receives is the unusually low noise level that prevails in this shop—particularly in the offices on both the upper and lower floor. The office and welfare addition to the main shop has concrete floors on both the first and second floors. The floor is laid over bar joists with corrugated iron forms. The floors on both levels are covered with asphalt tile. Room partitions are constructed of 2 by 4 studding, covered with rock lath and plaster. The exterior walls and ceilings are plastered over metal lath.

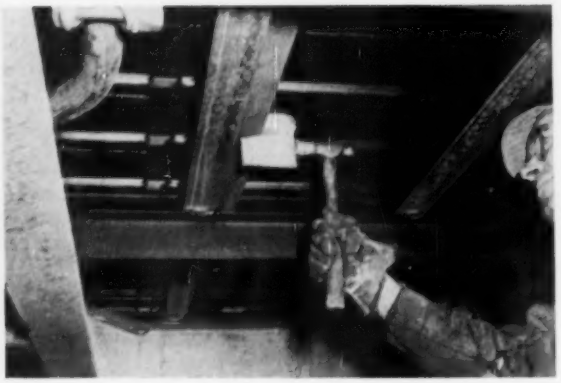
The shop area receives an abundance of natural illumination through horizontal projected-type windows and glass-block panels along the building walls. Windows are

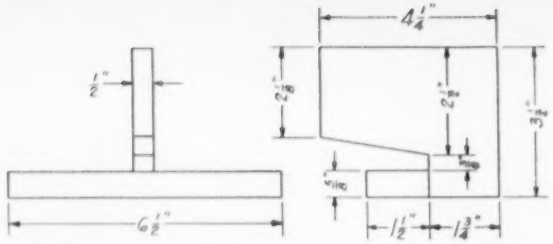


In addition to permitting the underframe structure to revolve for downhand welding, the spinner also allows movement along the outer rails of the jig



During the day, many heavy parts are handled by trucks to avoid having to clear the working area below the crane during move





A wedge of special shape (as detailed above) is used to clamp the Nailable Steel Flooring tightly against the end sills and the four stringers for welding it in place

also located in the clerestory over the center bay. Artificial lighting is provided by both mercury-vapor and fluorescent lamps.

Lighting throughout the addition is furnished by suspended-type fluorescent fixtures. A fin-tube base-board system has been installed for heating the offices and welfare areas.

Power Supply

Power is brought to the shop area at 35,000 volts. The main transformer cuts this to 4,500 and breaks it up into major circuits (either one large building or several smaller ones). Within the freight car shop banks of transformers near the ceiling reduce the voltage to 440, 220 and 110. The 440-power runs all welding machines and motors; the 220 and 110-volt circuits are for lighting only.

Six lever switches inside the shop kill groups of transformers. Master switches within the 4,500-volt major branches kill the whole building, or circuit. There is also a master switch on the 35,000-volt intake line that cuts the power to all the car shop buildings as well as to the locomotive shops three miles away.

Both Builds and Repairs

The new shop is equally adaptable to the construction of new cars or to the repair of old cars—and to doing either class of work to any type freight car. Its first major program was the construction of 1,000 box cars at the rate of 12 a day. The cars in this program are of 50-ton capacity with an inside length of 40½ ft. The outside width and height are 10 ft 5 in. and 13 ft 11 in. Inside width and height are 9 ft 2 in. and 10½ ft, and the capacity 3,890 cu ft. Half the cars will have 15-ft doors and half will have 6-ft doors.

All the cars will have Ride Control trucks, hand-operated slack adjustors and reflective tape on the exterior. There will be 750 cars with waste-substitute boxes, 250 with waste and neoprene packing retainers. Over a half dozen different draft gears are being applied, both rubber and friction; in some cases both types by the same manufacturer are being installed. The first 200 cars are getting the new cast steel wheels, the remainder conventional one-wear steel wheels. All cars will have threshhold plates.

A new type of side and end lining—called Nuloc—is being tried on the first 500 cars. The next 500 will get plywood in extra large (10 ft 3½ in.) sheets, and all end lining will be 1½ in. tongue-and-groove. The Nuloc siding is made up of 3¼-in. boards glued together with a tongue on top and a groove on the bottom. The first five panels from the bottom are 3 boards thick (9¾ in.). The next four are five boards thick (16¼ in.). On top of this are two finishing boards to complete the side lining.

Each section of paneling is toe nailed to each post using 8-penny common nails. The side lining is also face nailed using one 2½-in. screw nail to each board on each side post. Screw nails are also used on the end board using one 3-in. long nail to secure each board to each filler. The perishable strip is likewise secured by 3-in. screw nails. This strip is also extra wide (7¾ in.) to avoid nailing into the lining.

Mekydro Torque Converter

(Continued from page 79)

Delivery to the Army was made in Washington, D. C., during celebration of Transportation Corp's 13th anniversary. The locomotive was then returned to Eddystone where it is now undergoing further test. This unit differs only slightly from the Baldwin-built diesel-electric used by the Army. It will operate multiple-unit with mechanical or electrical transmission units.

indicated that the Maybach unit was the best available transmission for road locomotive service which had been thoroughly tested."

This torque converter has a transmission efficiency about the same as the electrical transmission—a little over 80 per cent. A single hydraulic coupling by itself would not have this efficiency over a speed range required for railroad service. A completely mechanical gear transmission is not practical for high power output because there are great changes in engine speed and tractive effort when gears are being shifted which results in excessive slipping, heating and wearing of the clutch. This multi-speed mechanical hydraulic transmission overcomes the difficulties found in either the mechanical transmission or the hydraulic transmission alone. A high transmission efficiency is obtained over the entire speed range of the locomotive, and yet the tractive effort curve is an almost continuous smooth line.

The usual hydraulic coupling consists of a centrifugal impeller and turbine mounted in the same housing and both completely surrounded by transmission oil. There are two features which characterize the Maybach transmission. One is the use of a second set of turbine blades not connected to the output shaft which move in during periods of gear shifting and load the input impeller so that the engine speed and loading will not vary. The second Maybach development is the overrunning claw clutch which eliminates the usual wearing difficulties of standard clutches and permits the transmission of much greater power.

The four-speed gearing is automatically shifted by a flyball-type speed regulator that responds to the relative speeds of the locomotive and the engine. The clutch linkages are moved by oil pressure. Radiator water is used to cool the Dekydro unit. This torque converter is energized, de-energized and reversed by solenoids which permit multiple unit operation with either diesel-electric or diesel-mechanical units. In event of electrical trouble, the transmission can be shifted manually when the locomotive is stopped.

The Mekydro, like the electrical drive, has practical lower and upper speed limits. The upper limit is governed by design of the rotating members. The lower limit—the continuous speed of the locomotive—is determined by the overheating of the oil in the torque converter. In its present state this unit cannot be adapted for dynamic braking. After Baldwin completes adjustments on the Army locomotive and conducts further tests with it, the 1281 will be placed in service by the Transportation Corps.

Concrete Boxes Speed Up Yard Servicing

Yard train delays caused by journal box oiling are reduced on the Frisco at St. Louis by a series of strategically located concrete storage bins for oil cans and jacking equipment. The bins are spaced every 250 ft, or five car lengths, along the outbound inspection track. They serve as a point for the oilers to exchange an empty can for a full one without stopping to refill.

The 250-ft spacing was chosen because the 2-gal cans hold enough oil for about five cars on one side. Thus, the oiler passes one of the boxes at just about the time that his oil can becomes empty. He leaves the empty can in the box and takes out a full one, oils the next five cars, repeats the exchange, and continues this procedure until all journal boxes have been oiled. The empty cans which were left in the bins are filled between trains.

The boxes are 2 ft wide, 2½ ft deep and 4 ft long. They hold ten oil cans, a journal jack, wheel iron and jacking blocks. A two-part steel cover is hinged in the center and is painted yellow for night visibility. The cans are filled from 3,000-gal tanks at each end of yard.

Continuous fluorescent lamps provide well-distributed illumination for 120 passengers on the head-end m-u cars and locomotive-hauled coaches.

Air Conditioned M-U and Locomotive-Hauled Coaches

Power from third rail drives, cools and heats Long Island m-u cars. Undercar power plants supply power for coaches used outside the electrified zone.

■ A total of 140 air-conditioned m-u cars and 80 locomotive-hauled coaches are now being built for the Long Island by the Pullman-Standard Car Manufacturing Company, at Worcester, Mass. The cars were purchased to replace obsolete cars and to meet the growing needs of increased traffic.

Existing cars which are to be retained in service are being equipped with greatly improved ventilation by means of circulating fans and new lighting which will produce illumination values of 25 footcandles on the 45 deg reading plane, 30 in. from the floor. Illumination values in all of the new cars will also be 25 footcandles.

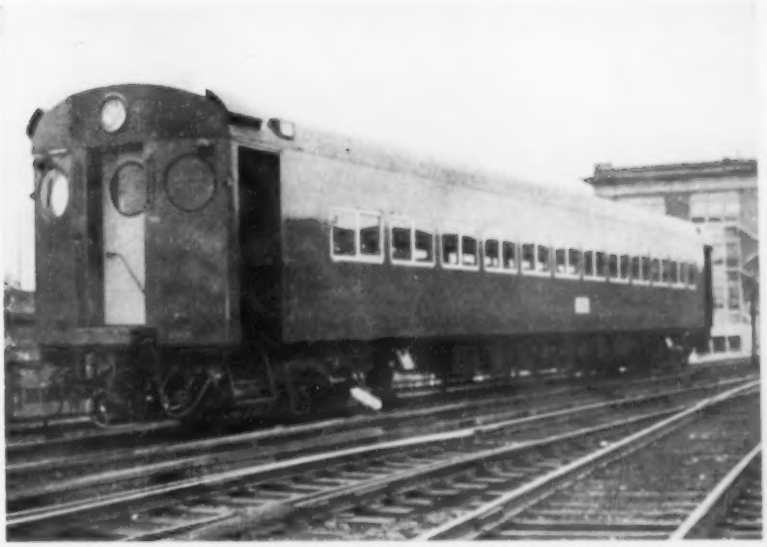
The new cars consist of 22 head-end motor cars, 74 motor cars without cab control equipment, 44 m-u trailers and the 80 locomotive-hauled coaches. All cars are essentially identical as to equipment and decoration. Head-end m-u and non-m-u coaches have a toilet at one end, and a seating capacity of 120. Other cars seat 123. All accessories such as seats, baggage racks, lighting fixtures and window curtains are identical and interchangeable regardless of manufacturer.

The car structure is a welded girder type design with plain painted sides, ends and roof. There are vestibules at each end and there are four sliding side doors and two sliding body end doors, except for the cab cars which have a swing type vestibule end door. For operation at high- and low-station platforms, there are four trap doors.

Glass fiber insulation, three inches thick, is used for insulating roof, sides and ends. Side windows are of the fixed unit frame assembly type of extruded aluminum with curtain guides.

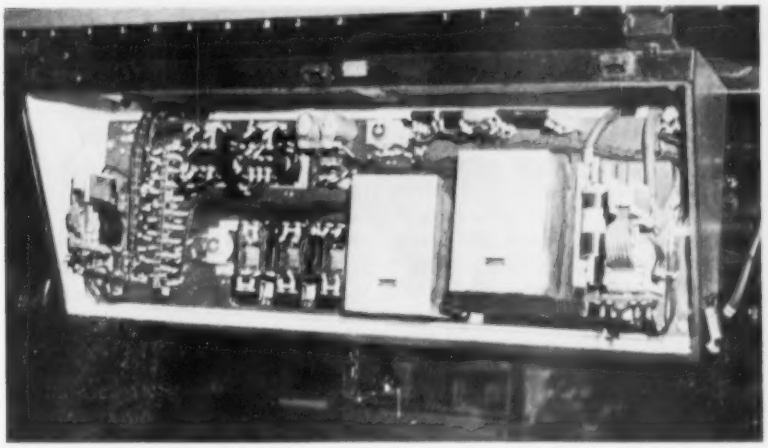
Floors are made of composition material covered with 9 in. by 9 in. gray and marbleized black rubber tiles laid in checkerboard pattern. Seats are of the two- and three-passenger design and are reversible walk-over type with stainless steel trim and plastic arm rests. Upholstery is green vinyl covered plastic. Cushions and backs are hair and spring type, the cushions having foam rubber topping for added comfort. Interior finish on sides is stainless steel. Trim includes cadet blue enamel with Navajo red stripe, while ceilings are white. The outside of the car is done in dark gray with green roof and light gray letters and red numbers.

For m-u cars with cabs and motorized trailers, the trucks are of the cast steel, four-wheel, single equalizer, bar type, with helical equalizer springs and combination elliptic and helical bolster springs. They have an 8-ft

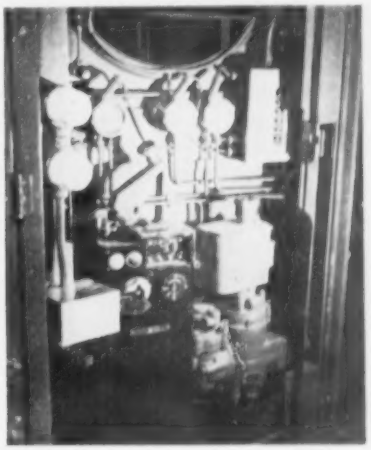


All 220 cars will have this same general exterior appearance. Shown is one of the 22 head-end motor cars, all of which will be equipped with automatic train control equipment.

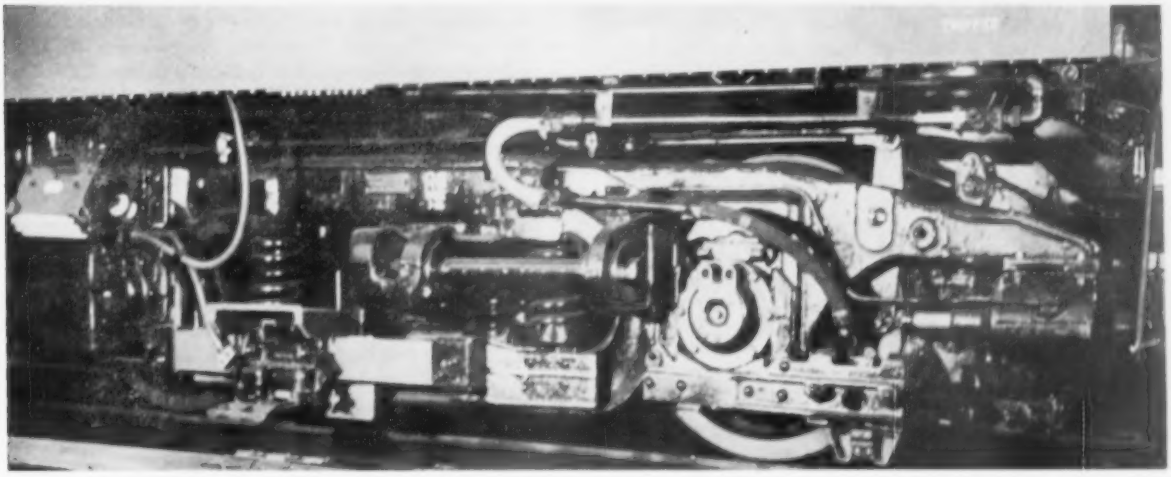
Panel on one of the car platforms controls the lighting, and auxiliaries.



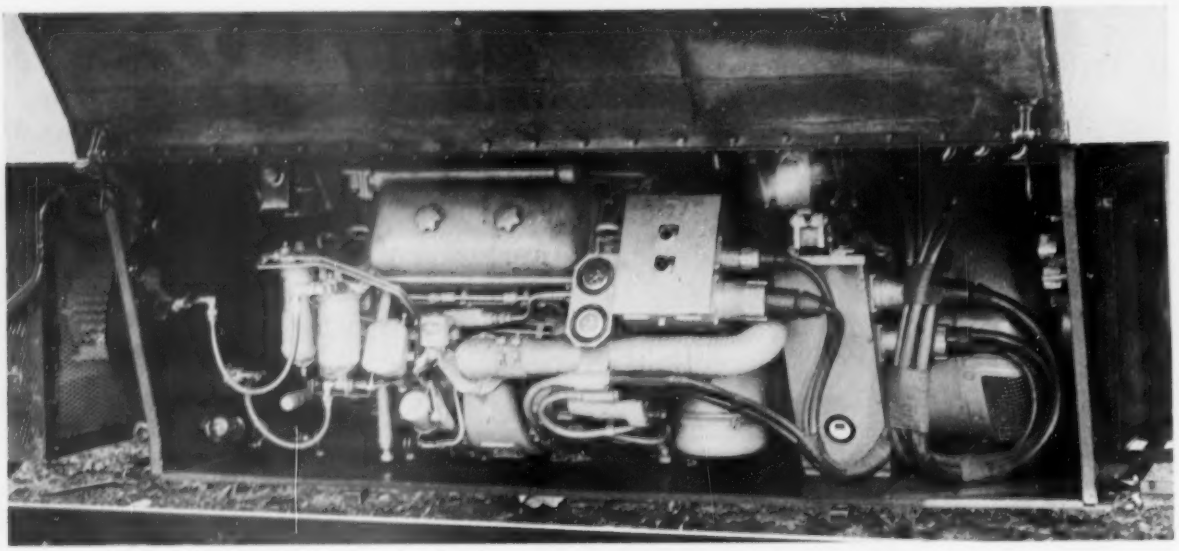
Motor generator set installed under the car is controlled by this cabinet. The 40-volt power generator is for traction control circuits, emergency lighting and battery charging.



Cab control equipment in one of the 22 head-end motor cars.



Trucks on the powered m-u cars have 8-ft wheel bases, are equipped with two 100-hp traction motors, and roll on 6- x 11-in Hyatt roller bearing journals



Diesel power plants are used on the locomotive-hauled coaches. The General Motors undercar units supply power for the fluorescent lighting and the motor-driven air-conditioning compressor.

wheel base, and 6-in. by 11-in. journals for roller bearings.

The 100-hp, self-ventilated traction motors are transom-hung with one motor geared to each axle with single reduction gearing and flexible couplings. All trucks without motors have an 8-ft 6-in. wheel base, and 5½ in. by 10 in. Hyatt roller journal bearings.

Brakes are designed in accordance with the Westinghouse Air Brake Company's schedule D-22-P for passenger car brake equipment, with D-22-AR control valve.

Cab cars only are equipped with Union Switch and Signal Company's three-indication, Type EL, two-speed, automatic speed control system.

Traction Motors and Control

Electrical equipment for car propulsion is supplied both by the General Electric Company and the Westinghouse Electric Corporation. The four traction motors on each motor car receive power at 600 volts (nominal) from the third rail. Two motors are connected permanently in series with 300 volts on each motor. With a train of normal consist, an acceleration rate of 1.00 mphps is obtained. Cars will operate in combination, having as few as 60 per cent motor cars and 40 per cent trail cars. Motors must operate on voltages which may vary from 725 to 400.

Motors have one stage of field shunting and the controller has 11 contact units for cutting out accelerating resistance. An acceleration relay limits the rate at which the motors can accelerate to a predetermined value.

Power for motor-car control circuits, and vestibule and emergency lights is obtained from a 600/40-volt m-g set and a 16-cell, 300-amp-hr lead-acid battery.

Lighting and Air Conditioning

General interior illumination is produced by continuous ceiling-type fixtures, each unit being equipped with two 40-watt, 115-volt fluorescent lamps. Power for their operation is obtained from motor-alternator sets. Vestibule, emergency, and marker lights are incandescent.

Headlights consist of twin, sealed-beam lamps operating from the battery charging voltage, with a resistance in series with the lamp.

All cars are air conditioned by a Frigidaire eight-ton system. It includes a motor-driven four-cylinder freon compressor, an air-cooled condenser unit having a total surface of 960 sq ft, with receiver, fan and motor unit, and a split evaporator with a surface of 560 sq ft. The evaporator blower motor is rated 1.5 hp and delivers 2,400 cfm of air.

Cooled air is distributed by Safety Car Heating and Lighting Company's ceiling-mounted air distributor and is delivered through a center ceiling duct.

Refrigerant compressors on m-u motor cars and trailers employ 600-volt d-c motors, while those on the locomotive hauled trailers are 3-phase, 60-cycle, a-c motors.

There is a recirculating grille in the lowered ceiling near the evaporator and there is a 1,000 cfm, motor-driven, exhaust-blower at the opposite end. Three points of cooling are provided.

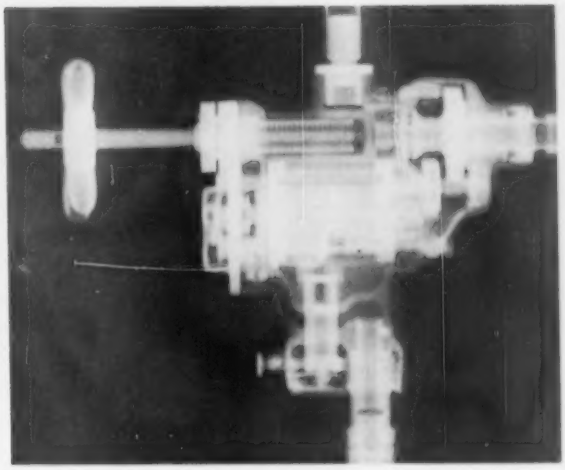
Frigidaire undercar power plants supply electric power to the locomotive-hauled coaches. They consist of a 3-cylinder, 2-cycle diesel-engine driving a 25-kw, 220-volt, 60-cycle, 3-phase, 1,200 rpm alternator and a 38-volt, 50-amp, d-c battery charging generator.

Heating

The m-u cars and m-u-car trailers are electrically heated by means of 30 kw of floor heat and 22 kw of overhead heat. The equipment, supplied by the Railway Utility Company, consists of heating units mounted along the side wainscot, and in the air-circulating system. There is also a cab heater, a windshield defroster and additional heat in the toilets. Controls provide for holding inside temperatures at 71, 73 or 75 deg F. Heating and cooling controls are interlocked so they cannot be operated simultaneously.

Locomotive-hauled coaches are heated by the Vapor Heating Corporation's Unizone steam heating system.

Radioactive capsule holder resting in a cavity on top of the extended piston rod. Lead cover for air lift hole shown in foreground and lead blocks for the protection of operating personnel, in the background.



Demonstration radiograph made at the Sacramento research laboratory of the Southern Pacific, showing how the various intricate inner parts of an air motor fit together. Radiographs have been particularly valuable in showing the interior assemblage of oil filters,—which can be determined in no other way.

On the Southern Pacific

Gamma Ray Radiography

Is Used Without Hazard to Operators

■ Southern Pacific has been able to increase six-fold the power of an atomic-radiation testing device used in its Sacramento laboratory, thanks to a special airlift devised by the railroad's technicians, according to an announcement by J. W. Corbett, vice president in charge of operations.

Under remote control, the airlift—a small pneumatic elevator designed and perfected at the laboratory—brings radioactive material up from underground storage to expose vital metal parts and tools to the penetrating gamma rays. After the rays have detected flaws deep inside the metal and have recorded them on sensitized film, much as X-ray pictures are recorded, the airlift returns the material underground. Technicians can then work within a few feet of the stored radioactive material, day after day, completely protected from it by the earth and by a lead cover over the airlift hole.

The Sacramento installation has been inspected and praised for its safety by representatives of the United States Atomic Energy Commission.

The radioactive material used is known as cobalt 60, a product of the atomic pile operated by the Atomic Energy Commission. The process of employing cobalt 60 to detect and record subsurface flaws is known as gamma ray radiography. This process also is useful to the railroad in revealing interior fitting of various complicated parts of enclosed objects such as filters and motors.

Although only a tiny piece of cobalt 60 is used, occupying a small part of a capsule which is only about $\frac{3}{8}$ in. in diameter and $\frac{3}{4}$ in. long, the rays it emits are so powerful that they have been used in the Sacramento Research Department of the railroad to radiograph the interior of steel objects as much as 12 in. thick, exposed for 16 hours at a distance of several feet from the radioactive capsule. Some exposures require only a few minutes. Power of the cobalt 60 is comparable to a two-million-volt X-ray machine.

The objects radiographed are in no way made radioactive by the cobalt 60, it is pointed out by P. V. Garin, engineer of research and mechanical standards for the railroad, and the objects can therefore be handled as soon as the exposure is ended and the cobalt 60 is again underground.

All precautions as required by strict federal and state laws are rigidly followed to provide safety for personnel assigned to this work, according to B. F. Kline, chief chemist in direct charge of the laboratory, and John C. Bristow, the railroad's radiographer. Only persons who have been approved by the Atomic Energy Commission may use such radioactive isotopes as cobalt 60.

Cobalt 60 is what is known as an artificially radioactive element, created from ordinary cobalt 59 metal irradiated by neutrons in an atomic pile. As a result of the irradiation, some of the cobalt 59 is transmuted into Coblat 60 which emits gamma rays.

Cobalt 60 is described as the successor to radium, costing about 1/44 as much. However, it has a much shorter life, its power decreasing by about one half every 5.3 years. Early applications of Cobalt 60, made by the Southern Pacific, were described in the September 15, 1952 issue of *Railway Age*.

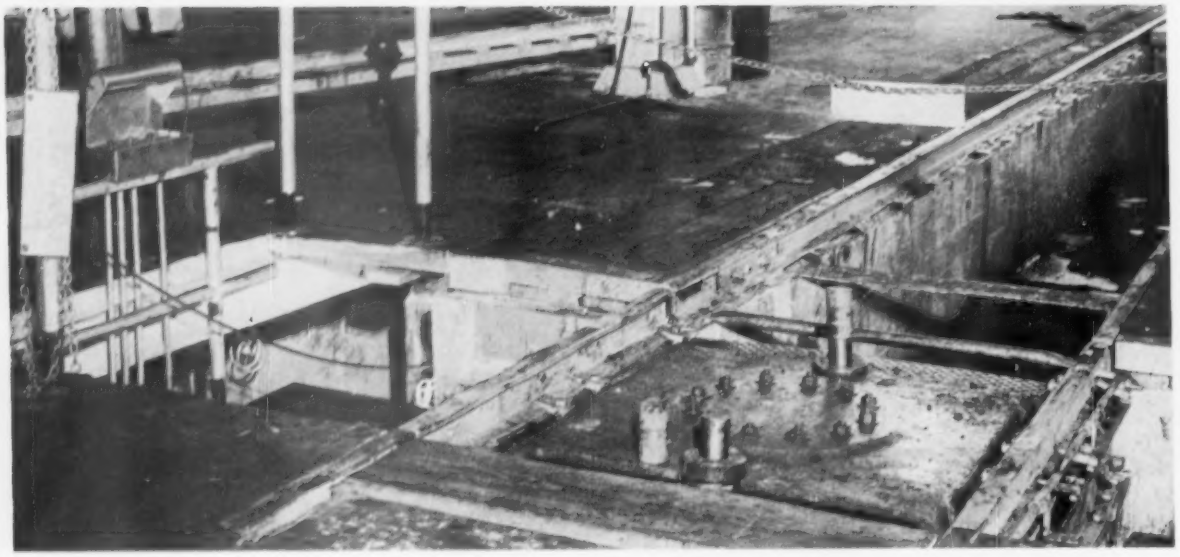


Fig. 1—A general view of the narrow table with a dropped working platform on either side.

Roundhouse Drop Pit Adapted to Diesel Needs

Union Pacific produces a good facility for dropping wheels and a motor by shortening the table and adding controls

■ A roundhouse drop pit is not a good device for dropping a pair of wheels and a motor from a diesel-electric locomotive. The reason is that the pit which was made wide enough to drop a large driver is too wide for the diesel. When a diesel is placed over such a pit, the jack for supporting the body when the wheels are removed is too far from the center of the table. Although the jack is placed as close as possible to the edge of the pit, the diesel drivers will rest on one end of the table. This will cause the hydraulic hoist to bind when it is used to take the weight of the motors and wheels.

To overcome this difficulty, operators in the Union Pacific shop narrowed the pit, and made the table correspondingly shorter. This allowed the jacks to be placed close enough to the center of the table so that the weight of the wheels and motor to be removed, is balanced on the table.

Before the motor can be removed, it is necessary to remove the nose suspension springs. To provide for this, the table is equipped with two small hydraulic cylinders or rams on each end of the table which operate push

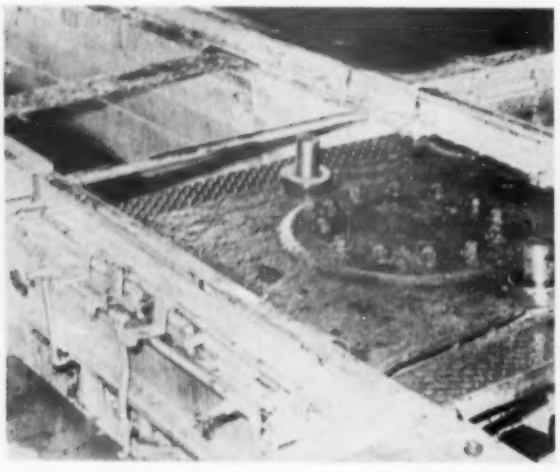


Fig. 2—The two rams raise one motor nose or the other. The valves at the side control flow of oil to the rams.

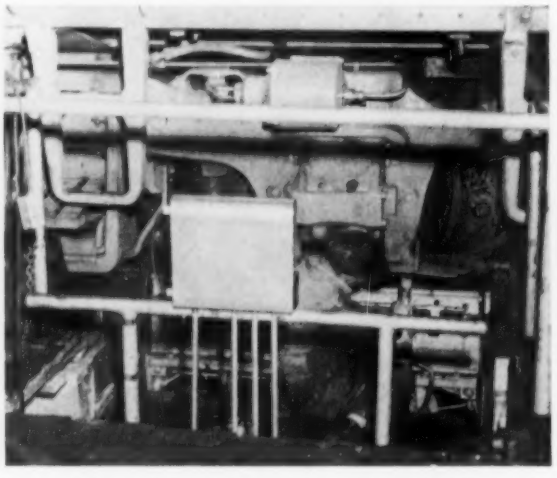


Fig. 3—Unit on drop pit and workman on lowered platform using impact wrench.

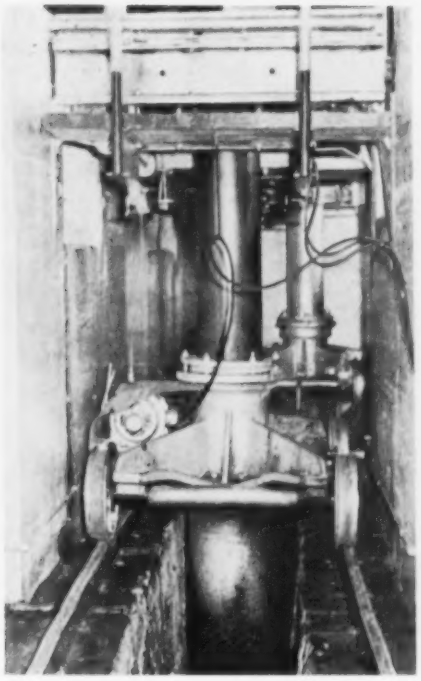


Fig. 4—Motor-driven trucks with hydraulic pistons for lifting tables.

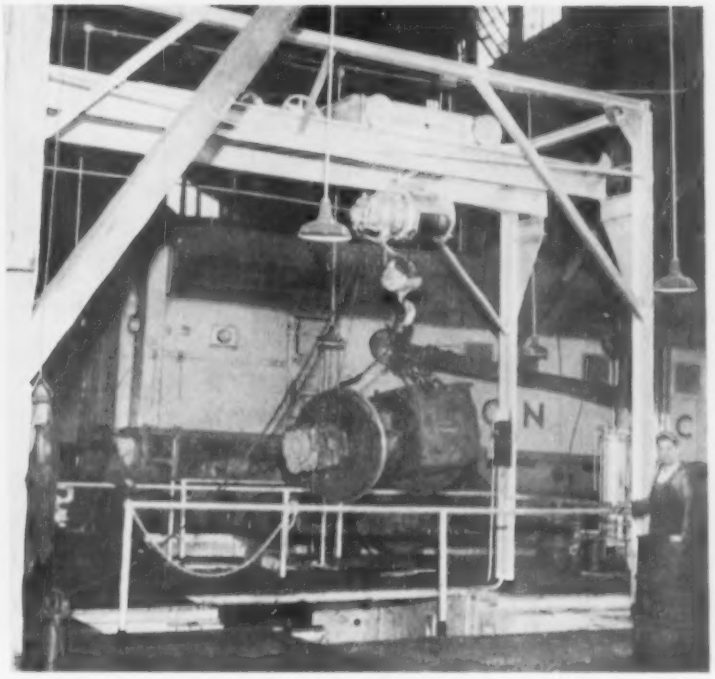


Fig. 5—An electric hoist is used to remove wheels and motors from an adjacent track.

rods, as shown in Figs. 1 and 2. One or the other of these rods, depending on which motor is being removed, is used to lift the weight of the nose of the motor, while the springs are taken out.

The valves at the left in Fig. 2 are used to select which one of the rods that is to be raised, and when both valves are closed, the rods will remain in any position to which they have been raised. It will also be noticed in Figs. 1, 2 and 3 that there is a lowered working platform at each side of the table to allow for convenient use of a torque wrench.

Pushbutton controls for the table are placed at one end of the pit, as shown at the left in Fig. 1. The first button at the left raises the table, the second lowers it, the third operates the ram which is to raise the motor nose, and the two at the right control the travel of the table in either direction from one track to another.

After a pair of wheels and a motor are removed, they are dropped down into the pit and moved to the adjacent roundhouse track by the motor-driven truck, shown in Fig. 4. When delivered to the next track, they are picked up by the motor-driven hoist shown in Fig. 5.

Vernatherm Tester

■ The equipment shown in the illustration was made in the Glenwood, Pa., shops of the Baltimore & Ohio for testing of Vernatherm temperature controls used on Electro-Motive diesel locomotives. The funnel is in the filling hole of a small tank full of water. Also in the tank is a dial-type thermometer, shown at the left. In the bottom, and connected at the right, is an immersion heater.

Mounted on the front of the tank so that its contacts are controlled by the heat of the water is the Vernatherm under test. Closing of Vernatherm contacts will operate corresponding lights in the box at the left and a little above the tank.

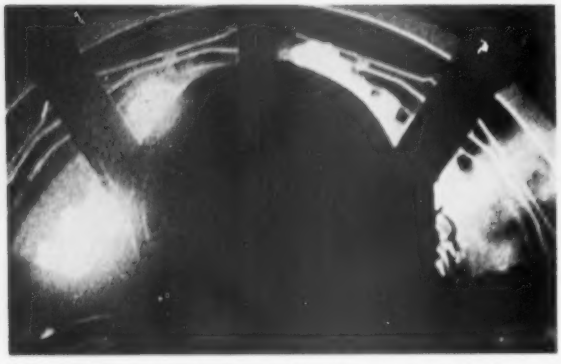
The test consists of first setting the Vernatherm contactor gaps as prescribed by the manufacturer of Vernatherm. Then the water temperature is increased until each contact closes and lights one of the indicating lights. The water temperature is observed as each light comes on and minor adjustments of the contact gaps are made until each one operates at its prescribed temperature.

The temperature at which each contact closes is measured.

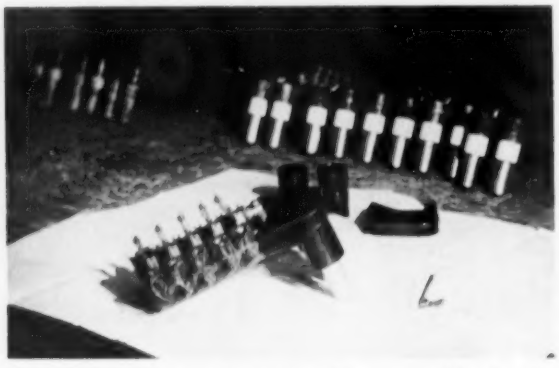
The boot is installed by slipping the bottom section up over the two insulated supports, then . . .

The cover is applied to the top and the two cemented together by a special sealer

Flashovers—How The North Western



When flashovers like this are avoided, damage to brushholders and insulators is negligible



The boot comes in two sizes, one to fit over porcelain pins, the other to fit the newer polyester and plastic pins

Has Almost Completely Eliminated Them

BY L. E. LEGG,
Electrical Engineer, C&NW

Certain things we do or don't do are definitely known to affect the frequency of occurrence and the intensity of flashovers. With all the maintenance precautions taken, flashovers still persist as one of the most costly items of maintenance. One railroad of average size spent over $5,000 in a single year for material alone to replace the porcelain brush holder insulators shattered in flashovers. Adding the labor to replace them and allowing for the train delays would no doubt triple this cost.

One primary reason certain main generators flashover so readily is insufficient clearance between the brush holder and the frame of the generator. Increasing the air gap would be the proper manner of rectifying such difficulty, but this would involve substantial changes in design and is impractical on existing equipment. The next best manner would be to effect as near as possible the equivalent of an increase in the air gap.

This has been done in the development of a neoprene

boot which has been designed to fit snugly over the brush holders of the main generator of EMD locomotives. This boot is simply a barrier which, through its insulating qualities, provides the equivalent of greater clearance between the brush holder and the frame of the generator. It opposes the free flow of current between the brush holder and the frame of the machine and the return of the current to a brush holder of opposite polarity under ionization. Here is what it has accomplished on the North Western.

On Aug. 1, 1953 16 F-3 and F-7 units were equipped with the neoprene boots. The 16 units selected for the test were those which had been the worst flashover offenders of the freight fleet. During this initial test of four months these 16 units accumulated 600,000 miles and not one porcelain or brush holder was damaged. In two instances slight "spattering" in the vicinity of the risers was observed which indicated that flashover current was arrested before reaching damaging proportions. The only other adverse observation was that the original neoprene boot was inclined to become impregnated with carbon dust and thereby cause slight grounding of the brush holder to the boot. While this caused no difficulty as no difference of potential exists between the two, this condition was corrected by glazing the boot with a high dielectric material.

C&NW To Equip All Units

So improved was the operation of these sixteen locomotives that the management decided to equip another 100 units for further test, the results of which were given on Nov. 19, 1954. During the years' operation of these 100 units there was no damage to porcelain or brush holders. As before, the most severe evidence of flashover was limited to slight "spattering" about the risers, and this occurred in only three instances.

Of the 591 units not equipped with the boots 7.44 per cent flashed over costing more than $12,000 for the year in labor and material. Of the 100 units equipped with boots, 3 per cent showed slight "spattering" and the cost was negligible. As a result of these tests—covering 11¼ million unit miles of operation, the C&NW is equipping all units to which the boot is applicable.

Experience in two different cases has further substantiated the effectiveness of this simple device. The first was when only eight boots were applied to a generator having twelve brush holders. When a severe flashover occurred, the four unprotected brush holders were damaged beyond further use while the eight having boots were not touched by the flash.

In the second case a three-unit locomotive pulling a heavy freight flashed over due to the No. 8 and 9 wire inside a control jumper breaking. As the defective control jumper was between the first and second units, it permitted the power contactors on the two trailing units to drop out under load when it broke. The power contactors were badly burned. The generator in each of the trailing units was subjected to the same abuse, and each one flashed over. One of the trailing units was equipped with boots and the other one was not. The one without boots received heavy damage to the brush holders as well as to the armature. The one with boots received only slight "spattering" as had been the experience in the few cases theretofore.

A mild form of flashover in most cases goes undetected by the engine crew. It manifests itself in the form of small copper beads on the copper surfaces and is usually found by the electrician on inspection after the run. This is referred to as "spatter." Other flashovers are sometimes so violent that brush holders are completely burned in two and armatures damaged beyond further use. Once the arc is struck and the current starts to flow or stray it sometimes increases to short circuit proportions before the ground relay has had sufficient time to trip and cut off the field excitation. Damage can occur between the time the ground relay trips and the field collapses.

The neoprene boot (made by the Equipment Research Corporation) seems to be the likely remedy for the flashovers which cannot otherwise be traced, such as a grounded armature coil, an eccentric commutator, defects in the external circuit, etc. A flashover is still almost certain to result if an armature coil suddenly develops a solid ground which permits heavy current flow into the lamination and thereby unbalances the electrical equilibrium. No known device will prevent the flashover from this cause. Fortunately, however, such cases are extremely rare. For most flashovers, the neoprene boot is nearly 100 per cent effective. There has never been a known instance in which this neoprene boot permitted the flow of current between the brush holder and the frame of the machine, or from one brush holder to another. Nor has there been a single known instance of a damaged porcelain insulator.

Photoelectric Flashover Protection

To the Editor:

I read with great interest your article by W. A. Kirsch, on flashover protection.

Daily, I see destructive damage due to flashovers on our locomotives. Some of the flashover damage could be called severe, but most of them are limited to end bar and brushholder pittings. Brush and spring pigtails are very vulnerable to the milder form of flashover or excessive sparking. The outside edges of the commutator segments and brushholder faces show very clearly that much ring fire is being carried under certain operating conditions. There is little or no visible evidence of traction motor damage in most cases of this kind. I feel that the impulse relay will be effective in preventing or limiting the damage due to flashover caused by extreme current stress, but that more could be done to forestall lesser or milder forms of main generator ring fire or flashovers.

I believe that a photocell with scanner properly filtered, and placed to scan the commutator between brushholders would pick up and activate a relay similar to the one Mr. Kirsch described. To have a more complete flashover control, this could be used in combination with the impulse circuit described.

I would appreciate the opinion of others as to the merits of this idea.

John W. Brown

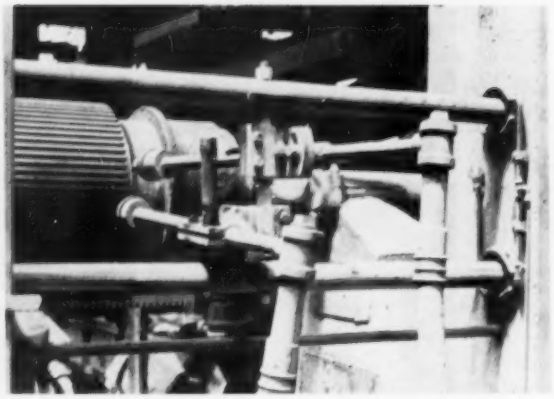
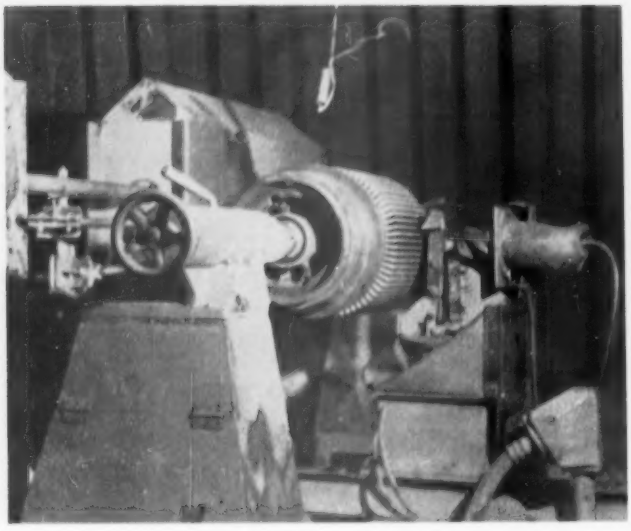


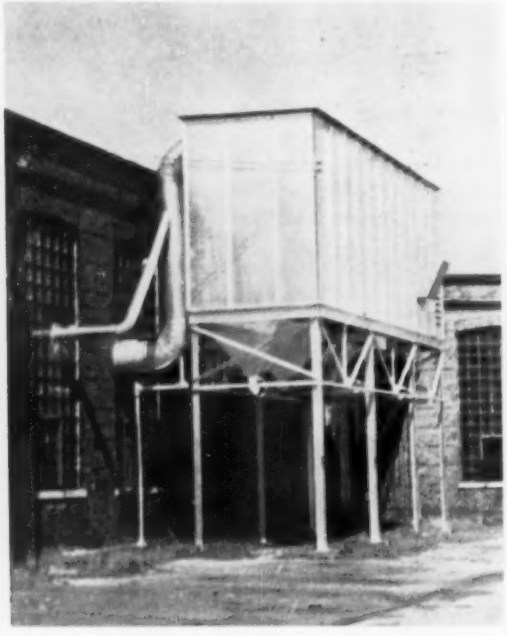
Fig. 1 (at left)—A core on the cleaning machine ready for the closing of the booth doors.

Fig. 2 (above)—The two cleaning nozzles mounted on the traversing mechanism.

Fig. 3 (lower left)—The ratchet at the right rotates the core one slot after each back and forth movement of the cleaning nozzles.

Fig. 4 (below)—The sand classifier which separates worn-out sand from that which can be used again.





Sand Blast Cleaning of Armature Cores

Rock Island works out procedure which does good work automatically without injury to laminations

■ The Rock Island electric shop now sand-blast cleans all of its traction motor armature cores which are to be rewound. The work is done in a Pangborn blast cleaning machine which has been adapted to the particular requirements of diesel traction motor armatures.

The core to be cleaned is mounted on a carriage which can be rolled in and out of the cleaning booth. This makes it possible to mount the core on the spindle of the machine outside the booth where a hoist is available. The machine in position for cleaning is shown in Fig. 1. Doors of the booth are closed during the operation.

The cleaning is done by two air-sand nozzles as shown in Fig. 2. They are inclined to each other so that sides and bottom of slots are exposed to the jet. For each slot, the nozzles are traversed from one end of each slot to the other, and back. The drive in the control box is transmitted to the nozzle traverse by the rack shown in the lower lefthand corner of Fig. 2.

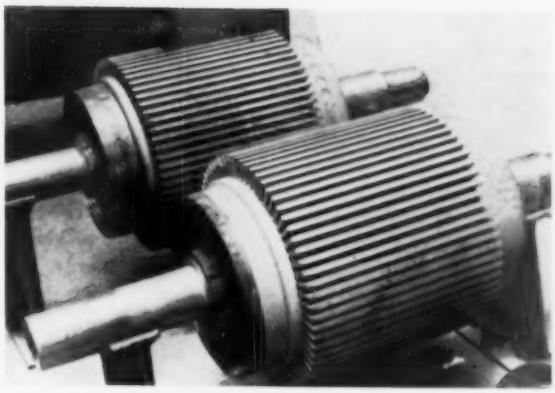


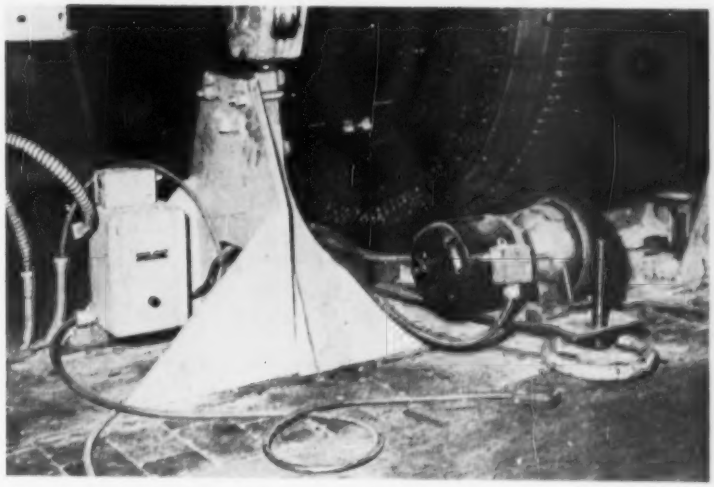
Fig. 5—A pair of cleaned cores ready for rewinding.

After each back and forth movement of the nozzles, the armature is turned one slot by means of the ratchet mechanism shown at the right in Fig. 3. Once set in operation, the machine continues to clean until the core has made one complete revolution, when it stops automatically. The control mechanism located in the cabinet at the left in Fig. 1, can be set for any length of slot, and any number of slots. The speed of operation may also be controlled.

The time of operation depends principally upon the length and number of slots. The average time on a traction motor core with 70 slots is about 35 minutes.

A fine grade of sand is used. The nozzle distance from the slots, and the amount of air pressure required was determined by varying these two factors until there was no peening of lamination edges, and no forcing of sand particles between laminations. This is accomplished by measuring the length of the lamination stack before and after cleaning. If there is any increase of length, it means that the nozzle distance must be increased or pressure reduced. Air pressure at the nozzles is controlled by a reducing valve.

Sand used in the booth is passed to the classifier shown in Fig. 4, which is located outside the shop, adjacent to the booth. Sand which has become too fine to do effective cleaning drops to the hoppers at the bottom of the classifier, and sand which is still sharp is returned to the pressure tank from which it flows to the cleaning nozzles.



Above: Armature drive and foot switch control.
At right: With his toe on the foot switch, the operator can always have his work in the most convenient position.

Armature Rotating Device

■ The work of overhauling generator armatures in the San Bernardino, Cal., shops of the Santa Fe, has been aided materially by a foot-switch-controlled drive for rotating the armature on its stand. It is used for applying string bands, for removing burrs and cleaning commutators and for general armature repair work.

The armature is mounted on a Peerless armature stand and is turned by a shop-made device which applies torque to the armature through a rubber tire which bears against the armature. The device consists of a ¾-hp. motor with a foot-switch control, driving a 10-in. rubber tired wheel through a 40 to 1 gear reduction. It is mounted on a steel plate which is hinged to the floor at one end under the armature. The outer end of the plate is supported by a threaded rod. The rod may be turned by a small handwheel to apply pressure between the rubber tire and the armature. The drive will rotate the armature at about 8 rpm.

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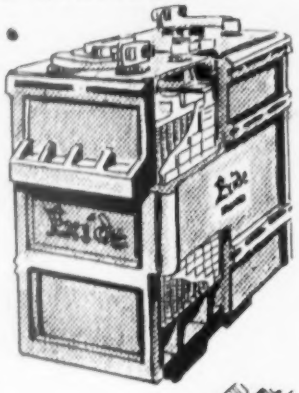

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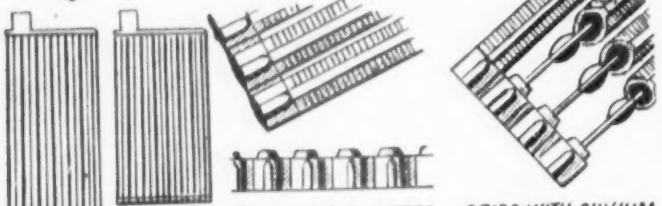

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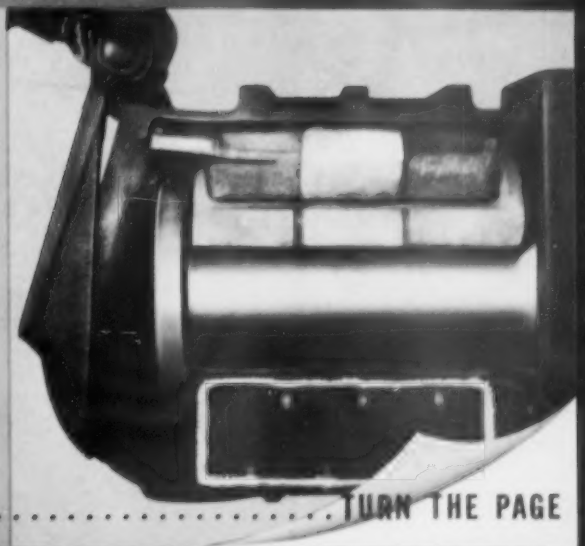
STOP HOT BOXES!

WITH

REDIPAK

JOURNAL BEARING LUBRICATING PAD

An Effective, Economical Solution
To The Hot Box Problem

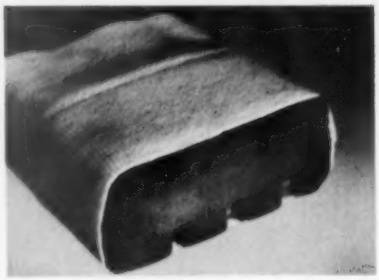


FOR FURTHER DETAILS.....TURN THE PAGE

STOP HOT BOXES with REDIPAK (CONTINUED)

SIMPLE CONSTRUCTION

What it is: The "Redipak" lubricating pad is a square block of foam neoprene, molded with cored passages, covered with cotton wicking material. It is fully symmetrical —that is, it can be installed either face up, any side out. Being somewhat shorter than the journal, it allows for lateral motion and creates no friction-generating thrust loads on the pad. Grommets in the four corners enable it to be removed easily with a packing hook.



How it works: The "Redipak" lubricating pad is installed simply by inserting it between the journal and the bottom of the box. The foam neoprene forces the cotton cover against the underside of the journal. The cored passages in the foam provide additional reservoir capacity and with vibration tend to act as pumps and permit a large volume of oil to saturate the neoprene, which has an open-cell structure. This keeps the wicking cover soaked with oil, which is transferred to the journal and bearing as the axle turns. It can operate for extended periods with no free oil in the box.

FOOLPROOF INSTALLATION

The "Redipak" lubricating pad is as nearly foolproof as engineering can make it. Since it is square, and symmetrical with respect to top and bottom, it can be installed either side up, any edge out.

The new pad is prepared for installation by soaking in warm oil for 24 hours, or by squeezing a number of times while submerged in oil. The oil-soaked pad is inserted through the journal box opening, and pushed in under the journal, using one hand like a shoehorn.

After the pad is inserted, oil is added until the level is two inches from the bottom of the box. After the initial oiling the oil level is maintained at about an inch.

The pad is easily removed with a packing hook which has had the point ground smooth or with a piece of bar stock with a hook bent in one end.

COOLER OPERATION

Positive journal lubrication under extremes of heat and cold is reliably assured with the "Redipak" lubricating pad. In hot weather cotton waste packs down and separates from the journal, leaving it without lubrication. In sub-zero weather the waste forms a tar-like mass with the oil, which works up under the bearing to form a waste grab. Both of these shortcomings are overcome with the "Redipak" lubricating pad.

In addition, this new lubricating pad delivers oil to the journal much more reliably than cotton waste does. It also develops considerably less friction. As a result, bearings and journals run cooler.

In laboratory comparison tests with waste packing, the "Redipak" lubricating pad under certain conditions operated at temperatures of as much as 50° F. cooler than the bearing lubricated by waste. There was never any tendency to glaze.

In laboratory starvation tests, which consisted of removing all free oil from the journal box, the only oil available to lubricate the journal was that contained within the "Redipak" lubricating pad. The test machine was operated at a speed of 60 mph and the bearing load was 20,000 lbs., ambient temperature 70° F. Under these conditions the bearing operated 10,000 miles before failure.

In service tests, "Redipak" lubricating pads have operated over 40,000 miles each, without noticeable wear. No pad has shown any sign of glazing, and inspection of bearings showed that the pad did not lint. The average temperature of the journals lubricated with "Redipak" pads was appreciably lower than those lubricated by waste.

LONG LIFE

As a result of extensive laboratory and service tests, the life of the "Redipak" lubricating pad is estimated at approximately three years of average freight car operation.

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Size of Journal	Dimensions		Weight (lbs.)	
	Length/Width	Height	Dry	Saturated
4¼ x 8	6½" square	3⅛"	0.85	3.00
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5½ x 10	8½"	3½"	1.50	5.00
6 x 11	9½"	3½"	1.70	6.00
6½ x 12	10½"	3½"	2.25	7.00

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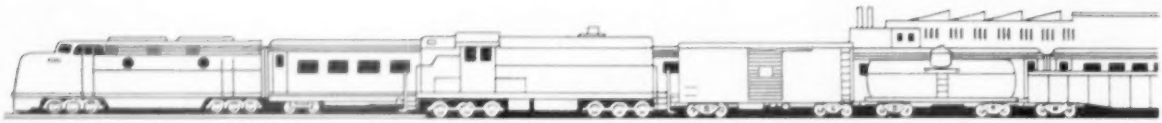

● PROGRESS REPORT: Your roundtable has really gotten around. It's not named yet, but we have had many suggestions. Massachusetts, Minnesota and Mexico have all been heard from (but not Texas!). Railroaders on the Illinois Central, the Reading, the Southern, the Southern Pacific, the New Haven, the Missouri Pacific, and many more have made suggestions. When everyone has had a chance to offer a name, we'll let you vote on them to pick the name that best identifies your new department. The coupon is again printed at the bottom of the page this month in case you haven't yet submitted your name. It must reach us by September 23. Don't forget that we will pay $25.00 for the name that is finally selected. More important, don't forget that since this is your department, questions and discussions about locomotive and car problems should come from you. To be answered next month: During the rebuilding of older diesel units, is the most economical solution complete rewiring? When it is used is this the thing that keeps the unit in the shop the longest, and if it is, how can this time be reduced?

Is there a solution to the problem of flat spots that develop on the wheels of diesel switchers?

(Last month a short discussion of this topic was prepared by the L&C staff. Most of the suggestions called for major changes, or the addition of more equipment to the locomotive. This month we have discussions which suggest that there can be times when there is not too much wrong with the locomotive as it comes from the builder—Editor.)

CHECK LOCOMOTIVE BRAKE EQUIPMENT *by O. L. Tomlinson, Machinist, Southern, Atlanta, Ga.* Good maintenance and proper attention can eliminate some wheel sliding. Assuming that the independent brake valve is the self-lapping type, there are two points to check. Accuracy of the brake cylinder gauge determines the precision with which the brake valve can be handled. If the pressure adjustment of the brake valve is set above the maximum tension of its pressure regulating spring, the excess pressure can remain in the brake cylinders with the brake valve in running position. If the adjustment is below that obtained with maximum spring tension, the brakes will then apply and release normally.

When brake cylinder piston travel is excessive, or if the packing leathers and piston rod felts are dry, then the release can be too slow to avoid sliding wheels. Pins and bushings in the brake rigging should be properly lubricated so they will offer no resistance to quick brake action. Finally, the hand brake should always be completely released.

RAIL CONDITION IS IMPORTANT *by E. C. Fowler, Locomotive Fireman, Southern Pacific, Los Angeles.* Rail conditions can be the cause of many flat spots. The writer calls attention to oil deposited on the head of the rail of many yard tracks. He says that this oil comes from car wheels. It is thrown there from the journal box because of the poor seal at the back of the box. Improved seals would help correct this situation, and would prevent some sliding.

Careless handling, and the improper use of the sanders can also result in flat spots. Proper maintenance of wheels, brakes and sanding equipment are important.

Have any special tools been developed for installing the newly-developed journal lubricating devices, can the regular packing hook be of any use, or is this strictly a hand operation?

[Not a solution, but another way of showing the complications that can arise from an unfamiliar device prompted the cartoon below—Editor.]

Q & A EDITOR Railway Locomotives & Cars
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Questions and Answers

Interchange Rules

This is the eighteenth installment of a series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs to, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirements of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, come from a background of intimate association with the application of the rules. Obviously, comments or opinions as of today, may be inapplicable after a revision of the rules or further interpretations by the Arbitration Committee.

188-Q—Since the so-called "Piggy-Back" movement has been expanded on cars operating in interchange service, can advice be furnished at this time as to responsibility for charges for repairs to cars or damage to loading devices and equipment on flat cars equipped for highway truck trailer service?

A—The appropriate Committees of the A.A.R. now have this general subject under consideration, but in the meantime the following may be observed:

(a) In the absence of special agreements to the contrary, charge for repairs to special loading devices and equipment should be on the basis of Rule 105 for material and actual time at the A.A.R. rate for labor.

(b) Car owner is responsible for damage to car proper and damage to loading device and equipment resulting from failure of loading device and equipment or from loading or unloading of trailer, when not associated with any Rule 32 condition.

(c) Until such time as there are more of these cars built and the A.A.R. Committee has an opportunity to make studies and determine actual costs of construction, settlement under Rule 112 for cars so equipped would be on weight basis at pound prices applicable to flat cars.

189-Q—What is the proper labor charge for renewal of Barber Stabilizer friction castings?

A—Labor charge for application of Barber Stabilizer friction castings to Barber Stabilized Freight Car Truck should be on the basis of Item 156 of Rule 107.

190-Q—Is there any minimum requirement as to Brinell hardness for A.A.R. Alternate Standard tubular axle?

A—Yes. When the Brinell hardness of A.A.R. Alternate Standard tubular axle is reduced below the minimum of 227 because of overheating, its efficiency as pertaining to breakage is reduced and therefore the Interchange Rules now provide that in such cases axles with Brinell hardness so reduced may be scrapped at the expense of car owner.

191-Q—In handling refrigerator cars having underslung heater boxes on and off car ferries or floats at tidewater locations, why is it important to observe whether tide conditions are low or high?

A—Because under extremely low or extremely high tide conditions a situation can exist wherein there may be no clearance between the underslung heater boxes on such cars and the apron or other parts of the ferry or float. Under the provisions of new Interpretation No. 10 to Rule 32, the handling line is responsible for damage from such causes where it has definite knowledge that same occurred in this manner, unless construction of car violates the A.A.R. Clearance Diagram.

192-Q—Where charge is made for the application of coupler shim by tack welding per Item 178 of Rule 107, is additional labor charge permissible for R. & R. of carrier iron or coupler?

A—Coupler shim applied per Figure 1 of Rule 20 should be charged on tack welding basis, per Item 178 of Rule 107. No additional charge is permissible for coupler or carrier iron R. & R., nor for jacking.

193-Q—Is it permissible to stencil air brake markings on the side of refrigerator cars immediately above the reservoir location or as close thereto as possible instead of on the reservoir itself, in the interest of eliminating contact from brine drippings?

A—No. Instances in which the markings on refrigerator cars become obliterated due to brine corrosion are rare, and in the few instances where it does occur it is usually caused by defective drain equipment, leaky floor, etc. Splashing of the reservoir from brine drippings released through the drain tube can be prevented by the use of a metal shield. The expense incurred as a result of the few instances in which the markings are obliterated due to brine drippings would be more than offset by the confusion which would be caused if an alternate location for the stenciling were permitted.

194-Q—Inasmuch as the table in Section B of Rule 112 for per pound prices to be used in settlement for destroyed cars was modified in Supplement No. 1, effective August 1, 1955, to include a column covering per pound price for Class A flat cars only, what method is to be used hereafter insofar as flat cars other than Class A are concerned?

A—Per pound prices in the column of this table headed "All Others" should be used in settlement for all types of flat cars other than Class A.

195-Q—How should charges and credits be handled where A.A.R. Standard axle is removed and A.A.R. Alternate Standard tubular axle is applied?

A—The intent of Paragraph (q) of Rule 17 is to permit charge covering the difference between tubular and solid axles regardless of responsibility for repairs. This means that the amount of the charge must be determined by Rule 98, Section (b), which confines the charge in case of handling line responsibility to secondhand value of the axle applied.

196-Q—What would be the proper charge for renewal of pipe bracket and AB cylinder in connection with periodic air brake attention per Item 15 of Rule 111?

A—Second Note under Rule 111 is not intended to permit additional labor charge for R. & R. of four pipe bracket bolts and R. & R. of six cylinder bolts when "AB" pipe bracket and "AB" brake cylinder are

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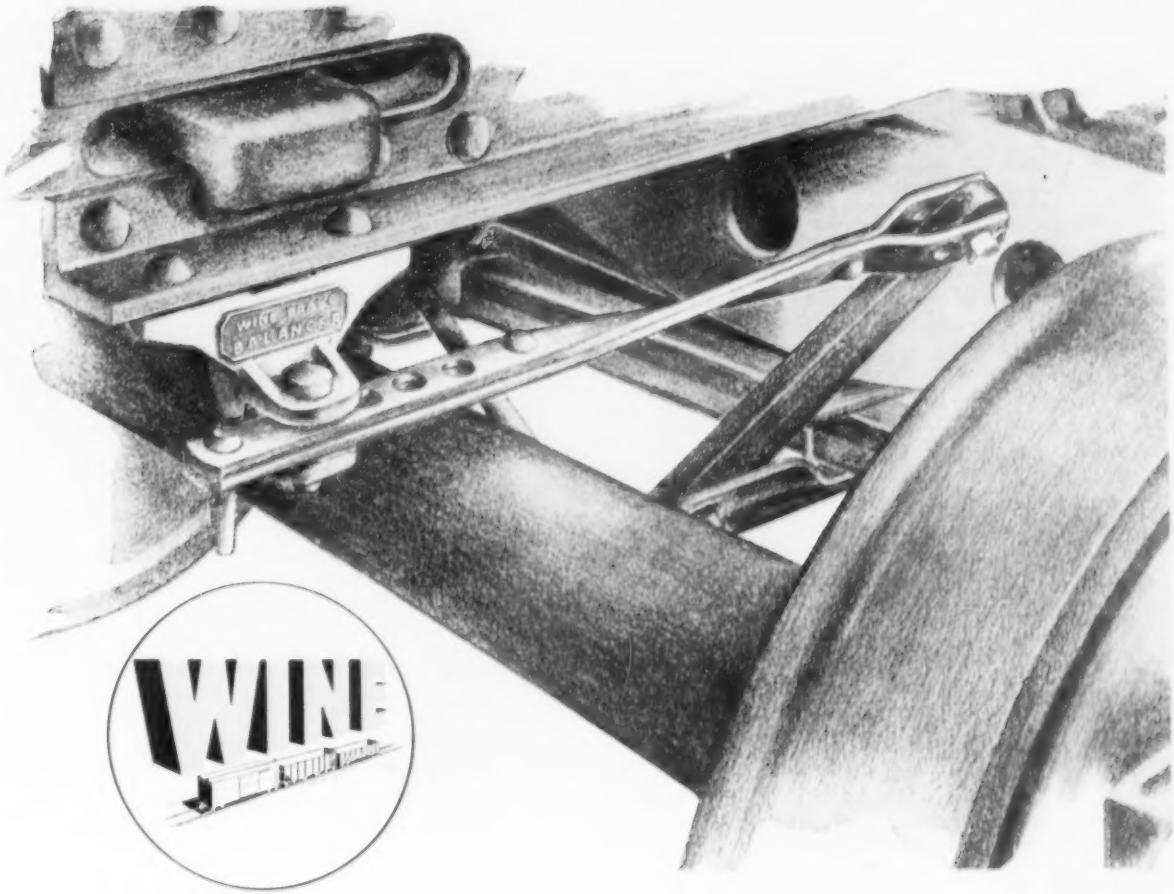

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renewed in connection with Item 15 or 15-A, cleaning of "AB" brakes, as the charges provided in Items 16 and 19 of Rule 111 are intended to cover all labor involved. However, such bolts renewed separately account of being defective (when pipe bracket and cylinder are not renewed) additional labor charge is proper per Items 26 and 27, of Rule 107, whether or not Items 15 or 15-A of Rule 111 are involved.

197-Q—Would it be consistent to establish requirements in the Interchange Rules to provide for the issuance of defect cards in interchange versus delivering road covering tar applied to cracks between floor boards of box cars?

A—No. If such a rule were to be established, same would have to be made effective in interchange in general. This would place an impossible burden on interchange inspectors as it would be necessary to open the doors on all empty house cars to determine whether or not this condition existed and then close such doors. Furthermore, this condition could not be detected on loaded house cars, with the result that the road on which the car was unloaded would have to assume responsibility for this condition when next delivered empty in interchange, even though such road might be entirely innocent.

General Motors

Diesel-Electric Locomotives

This is a new series of Questions and Answers pertaining to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

G318-Q—What will result from a blown battery charging (auxiliary generator output) fuse?

A—The auxiliary generator will be cut off from the low voltage system and force the battery to supply the low voltage requirements.

Auxiliary Generator Field Fuse

G319-Q—What protection is given by this fuse?

A—This is a 30 ampere fuse and protects the auxiliary generator field windings against excessive current.

G320-Q—What will result from blowing of this fuse?

A—The auxiliary generator will be prevented from supplying current to the low voltage system.

Voltage Regulator

(Manual 2130, page 313)

G321-Q—What is the function of the Voltage Regulator?

A—To cause the auxiliary generator low voltage to remain at approximately 74 volts, whenever the engine is running.

Wheel Slip Control

G322-Q—What action is initiated if a pair of wheels slip?

A—If a pair of wheels slip, one of the wheel slip relays initiates the action that (1) lights the wheel slip light, (2) inserts a choking resistor in the main generator shunt field circuit, (3) opens the battery field circuit and (4) moves the load regulator toward the minimum field position.

G323-Q—How many interlocks does the wheel slip relay contain?

A—Two.

G324-Q—What is used to provide additional interlocks as needed?

A—An auxiliary wheel slip relay (WSA).

G325-Q—Describe the relays and interlocks in detail.

A—When a wheel slip relay closes, one interlock lights the wheel slip light while the other interlock causes WSA to be energized. When WSA is energized, its interlocks open to insert a resistor in the shunt field circuit and open the circuit to the battery field operating coil.

G326-Q—What action takes place when the battery field contactor opens?

A—When the battery field contactor opens, its normally closed interlock (DC) closes, energizing the overriding solenoid (ORS) in the governor.

G327-Q—What happens when the overriding solenoid is energized?

A—The load regulator moves toward minimum field position.

G328-Q—How is the main generator affected during wheel slip action?

A—Since the shunt field contactor does not open during wheel slip action, a fast but controlled unloading of the main generator is effected.

G329-Q—To what point does generator unloading continue?

A—To a point necessary to stop the slipping.

G330-Q—When this point is reached, what happens?

A—Power is then automatically applied at a slightly lower load than that at which the slipping was terminated.

Ground Relay (GR)

G331-Q—What is the ground relay?

A—Located in the electrical cabinet, it is an electrical protective device connected to the high voltage system.

G332-Q—What is the function of the ground relay?

A—To automatically unload the main generator in case of a ground in the high voltage system.

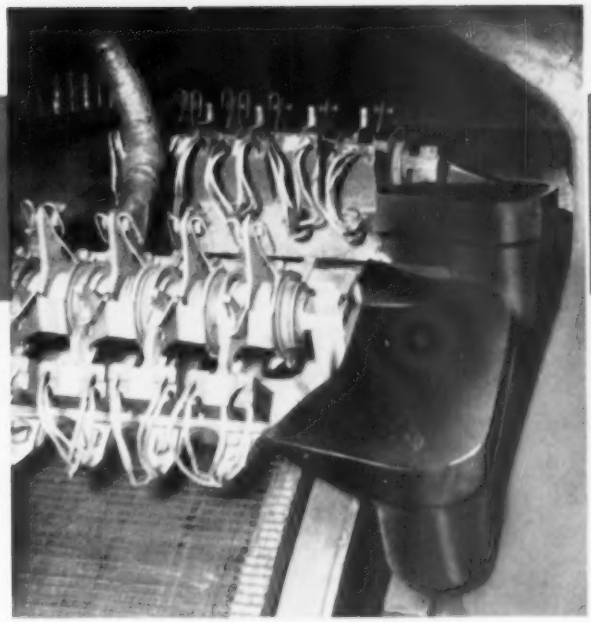
G333-Q—How can a "ground" be defined?

A—As current passing through the frame or car body of the locomotive.

(Manual 2310, page 314-315)

G334-Q—What takes place if a ground occurs in the high voltage system?

A—The ground relay will trip.



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Questions and Answers

Fairbanks-Morse
Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

F294-Q—What are the locations for filling?
A—Filling is through a filler pipe with a corrugated male coupling located one on each side of the locomotive, or through the roof filler vent pipe in emergency.

F295-Q—How may it be known when filling is completed?
A—When filling from the side, water should run into the system until it starts to run out the opposite filler pipe.

F296-Q—What are the various cooling system capacities in gallons?
A—1,600 hp—300 gallons; 2,000 hp—320 gallons; and 2,400 hp—340 gallons.

F297-Q—What takes place if the system is filled with engine running and then the engine is shut down?
A—Water will overflow until the radiators drain.

F298-Q—What should be done after filling an empty system?
A—Run engine for several minutes to eliminate air pockets; then shut down engine and after five minutes add more water if needed.

F299-Q—What precaution should be observed if a hot engine has been drained?
A—Never refill with cold water. Doing so may cause liners to crack.

Draining Cooling System

(Bulletin 1706—118-A, page 5)

F300-Q—How should the radiators, oil cooler and engine water tank be drained?
A—Open valve at bottom of engine water tank.

F301-Q—What is done to drain engine exhaust manifold water jacket?
A—Open valve at pump end of engine.

F302-Q—How would you drain the cab heaters?
A—Open cab heater drain valves located in the engine room on each side opposite the main generator.

F303-Q—What else should be done?
A—Remove drain plug from the water pump.

Adding Water Treatment

F304-Q—Where is water treatment added to the system?
A—Through a plug in the top of the engine water tank on the left side.

Cold Water Precautions

F305-Q—What must be done when an engine is shut down in freezing weather?
A—The cooling system must be drained or steam supplied through the standby lines.

F306-Q—How is steam admitted to engine water tank?
A—Open valve in steam line to engine water tank. Valve is located on floor just ahead of the left engine room side door.

F307-Q—How is steam admitted to the engine water jacket?
A—Open valve in its steam line. Valve is located at the pump end of the engine.

F308-Q—How is steam admitted to the cab heaters?
A—Open valve to the heaters in their steam line. Valve is located overhead in the nose.

F309-Q—What precaution must be taken when applying steam to cab heaters?
A—Always have water on at the same time because live steam alone will melt the heater elements.

F310-Q—Should steam be admitted to the cooling system when the engine is running?
A—No; the engine will overheat.

F311-Q—What should be done with steam-generator-equipped units when an engine is shut down?
A—Standby steam should also be admitted to the steam generator water tanks and sanitary water tank.

F312-Q—Where is the steam admitted for this purpose?
A—Standby steam is admitted to the unit through a 1-in line into the main steam line at the left rear of the car body.

Electrical Control System. Description of Parts

(Bulletin 1706, 132A, Page 1)

F313-Q—What is the function of the Load Ammeter?
A—Indicates current to traction motors on front truck.

F314-Q—What is the function of the Standby Lighting Switch?
A—This is a two-pole selector switch for connecting lights to locomotive battery or transformer when on shop power connection.

F315-Q—What is the duty of the solenoids in electro-hydraulic governor?
A—To control governor action.

F316-Q—How does the Battery Charging Contractor function?
A—Connects the auxiliary generator to the battery and the low-voltage control circuits (except the alternator field which is taken directly off the auxiliary generator.)

(Bulletin 1706, 132A, Page 2)

F317-Q—What is the function of the Braking Relay?
A—Throws cam switch to "Motoring" when throttle selector is moved from "OFF" to "1" with generator switch off. (only on units equipped for dynamic braking)

F318-Q—What is the purpose of the Brake Warning?
A—Informs engineman when brake warning relay is energized on any unit. (only on units equipped for dynamic braking).

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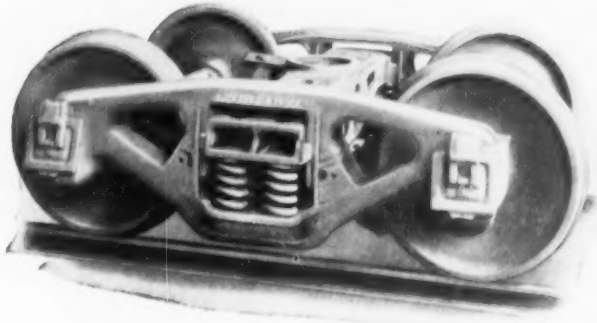

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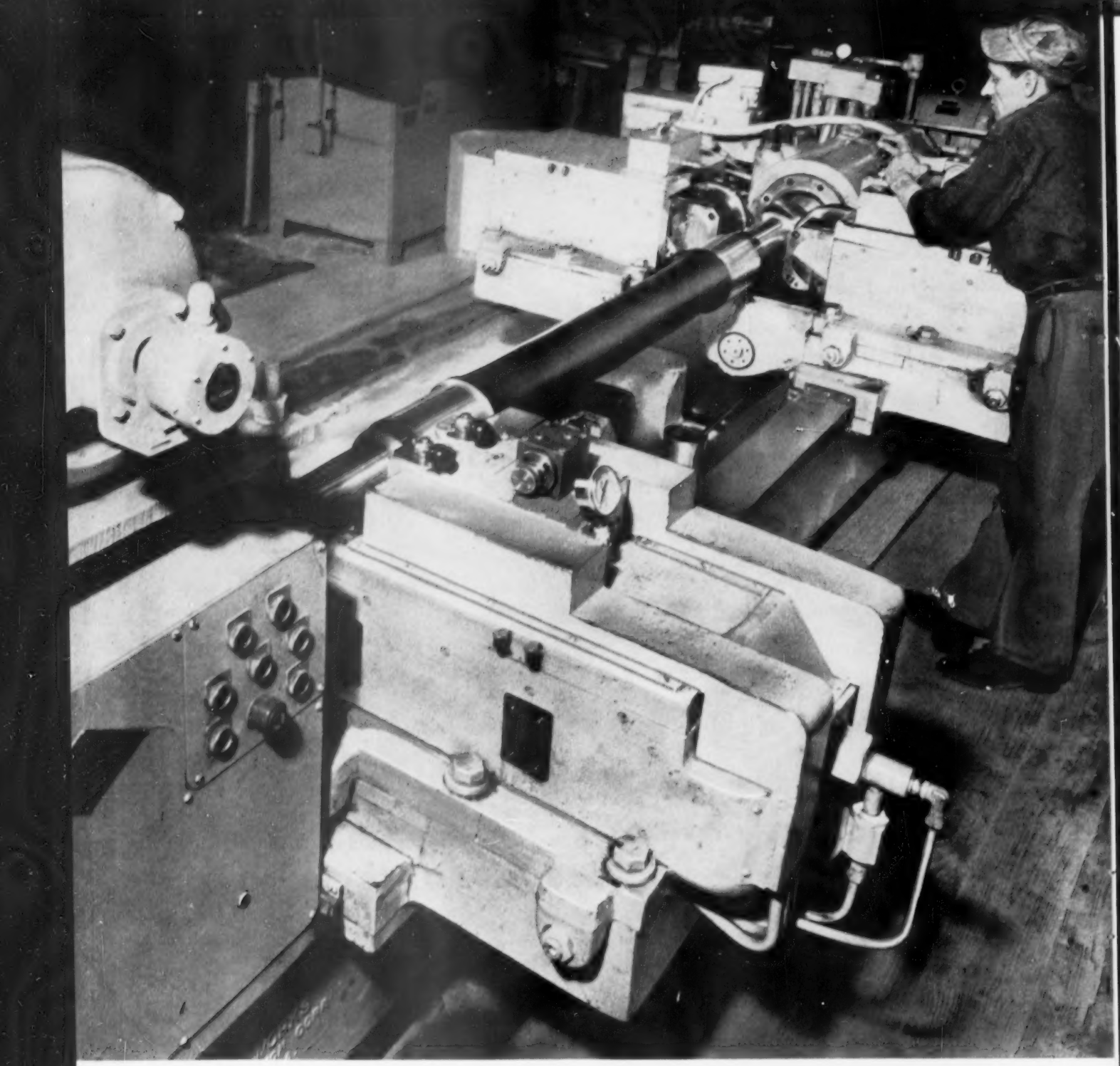

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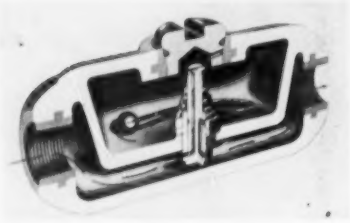
EQUIPMENT

(Continued from page 22)

adjusting nut. The tool is made in a range of sizes to fit machines with spindle diameters from 3 in. through 8 in., and draw key slots from 33/64 x 1⅛ in. through 11/16 x 1⅝ in. A wide range of wedge adjustment accommodates variations in shank and spindle slot location. There are no attachments to the machine spindle and, in use, the key is entirely within the spindle slot.

The tool shank is inserted in the spindle, the adjustable draw key is inserted through the spindle and shank slots, and the adjusting nut in one end of the key is turned with an Allen wrench. This expands the wedge in the key to seat the tool shank securely in the spindle and lock it there until the adjusting nut is reversed. This adjustable key can be completely disassembled for cleaning and lubrication by removing two pins. All parts then come out of the body barrel except the wedge which slides out of its own slot. *Davis Tool Division, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.*



Air-Line Lubricator

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The lubricant is made in two sizes. Model IRO-8 is for use with tools utilizing 14 to 130 cu ft of air per min. Its capacity is ½ pt. Model IRO-16 is for tools using 40 to 200 cu ft of air per min and has a capacity of 1 pt. The feeding valve is adjustable for all standard lubricants and will operate satisfactorily over the entire normal working temperature range. Lubrication can be shut off when not in use. The lubricator will operate in any position. *Ingersoll-Rand, 11 Broadway, New York 4.*

Portable Electrical Cord

U.S. Laytex Royal Master cord is made for use with grinders, drills, power saws, buffers and other types of heavy-duty electrical tools. It incorporates features new in cord construction. The manufacturer claims its product has 488 per cent greater resistance to flexing than the average of present, old cured cords; is 118 per cent more re-

Sets NEW PRODUCTION STANDARDS for Vertical Boring and Turning Work...

46" MACHINE ILLUSTRATED—with Turret, Ram, and Side Head

—

Wide variety of head combinations available

the All New KING

These new King machines — *completely redesigned* — will bring to boring mill users the *greatest productive capacity ever achieved for vertical boring and turning work!*

Greater horsepower, increased speeds and feeds; simplified controls; many power-operated devices — will *increase your productivity.*

Advanced engineering of mountings for spindle and for all heads and turrets — substantially increased machine rigidity — will give you *greater-than-ever accuracy.*

With maximum use of *unit* construction and many components redesigned to reduce wear, you'll have a minimum of machine maintenance and downtime.

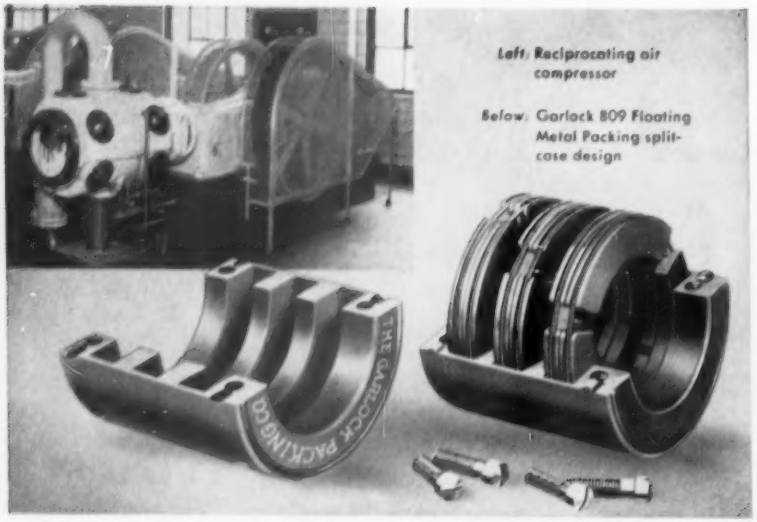
For full details on new model King machines send for new Catalog K-5 covering 30", 36", and 46" sizes. (Catalogs on larger sizes will be available later.) Write to us direct or to the King distributor in your area.

Here are a few of the many advanced KING features....

- 40 to 50 H.P. on 30" to 46" sizes.
- 75 to 100 H.P. on sizes 56" and up.
- 24 feeds available.
- Feed selection from direct-reading dial.
- 24 speeds in geometric progression in any of three standard ranges.
- Pendant-located control of:
  - pre-selective speeds from direct reading dial.
  - speed change.
  - head movements in either feed or rapid traverse.
  - power swiveling of rail heads at rapid traverse or feed rate.
  - power indexing of rail head turret and side head tool block (optional).
- Automatic lubrication of all moving parts.

AMERICAN STEEL FOUNDRIES, KING MACHINE TOOL DIVISION
1150 Tennessee Ave., Cincinnati 29, Ohio

KING Vertical Boring and Turning Machines



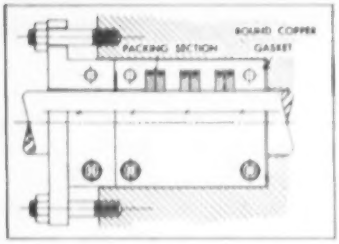
Left, Reciprocating air compressor

Below, Garlock 809 Floating Metal Packing split-case design

For air compressors, users report

GARLOCK SPLIT-CASE METAL PACKINGS

have 2 big advantages



1. LONG, TROUBLE-FREE LIFE. Minimum of 7 years with proper lubrication.

2. CAN BE INSTALLED *WITHOUT* DISCONNECTING THE ROD. Downtime is reduced to a minimum.

You can eliminate the cost of frequent packing replacements and unnecessary downtime by installing Garlock split-case metal packings on your reciprocating air compressors. Service reports show that these Garlock metal packings have given 15 years and more of trouble free service with a minimum of rod wear.

For complete information, call your Garlock representative or write today for Brochure 3889.

THE GARLOCK PACKING COMPANY, PALMYRA, N. Y.

Sales Offices and Warehouses: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, Los Angeles, New Orleans, New York City, Palmyra (N.Y.), Philadelphia, Pittsburgh, Portland (Ore.), Salt Lake City, San Francisco, St. Louis, Seattle, Spokane, Tulsa

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK

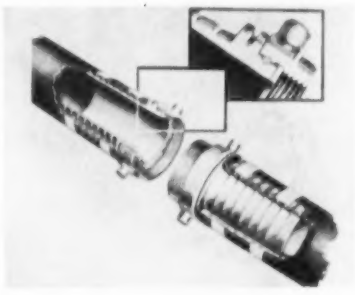
PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS, RUBBER EXPANSION JOINTS

sistant to tearing, and has 197 per cent greater impact strength. It is also 26 per cent more oil resistant, 33 per cent more heat resistant, and has 38 per cent more breaking strength, 50 per cent more resistance to cutting, and 58 per cent more abrasion resistance. *United States Rubber Company, Rockefeller Center, New York 20.*

Heavy Duty Wrench

This wrench is equipped with a Z-shaped spring that is notched to fit under a pin running transversely through the wrench housing, the pin acting as a pivot. The spring is said to give a double action in the wrench operation; the bite and release are much easier and more rapid, and ratcheting is improved.

Designated the Pipemaster, the wrenches are made in 6 in. through 48 in. sizes with straight handles, and 8 in. through 18 in. in the offset type. *The Erie Tool Works, Erie, Pa.*

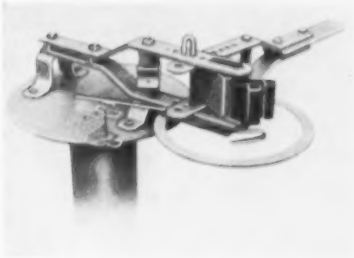


Shank Hose Coupling

Designed for handling petroleum products, this coupling can be utilized with any liquid where suction or discharge is involved. A replacement pin lug or hex swivel nut and a cast-in flange are two of

the features of the Universal union shank hose coupling. A tie wire, which secures the swivel ring to the shank, permits easy replacement should the threads ever be damaged.

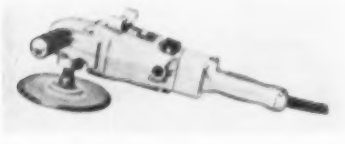
The cast-in flange acts as a cushion upon which the hose end rests. A groove in the flange provides anchor area for hold-back wire to prevent pulling apart of hose under severe pressure conditions. The coupling designated as No 800, is available in 2 and 3 in. sizes. Other sizes are available on request. A corrugated shank gives positive hose gripping area without injuring the hose. *Universal Valve Company, P.O. Box 441, Elizabeth, N.J.*



Bending Dies

Six bender dies for maintenance and production work in metal-working shops can be utilized to bend rounds, pipe, flats, tubing, squares, conduit and angle iron.

The Bulldozer die makes round or square bends on flat-stock up to $\frac{3}{16}$ in. thick and 4½ in. wide. It can also be used for making intricate bends on wire up to ¼ in. diameter. The Edgebend die, two to a set, bends flat stock sideways. Capacity is ¼ by 1¾ in. cold. The Special O.D. steel tubing die, in 11 sizes from ⅜ to 2 in., bends from 1¼ to 24 in. radii. The Special pipe die makes close return bends on pipe with radii from 1¼ to 36 in. Eight sizes are available. The 90-deg conduit die can be used for bending standard pipe and rigid conduit and is available in seven sizes from 1½ in. down to ⅜ in. The Thinwall electrical metallic conduit die can be used to bend conduit in sizes from ½ to 2 in. Full round and smooth bends are made without wrinkling. *Hossfeld Manufacturing Company, Winona, Minn.*



Portable Sander

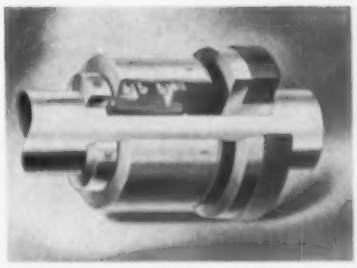
According to the manufacturer, this tool possesses 20 per cent more power than its predecessor, yet the weight has been reduced by 20 per cent. The motor of the 7 in. sander has been redesigned and tailored for the requirements of general-purpose maintenance and production work.

The device employs a centrifugal fan, affording great air velocity through the commutator section. Its handle has been redesigned for a more comfortable grip.

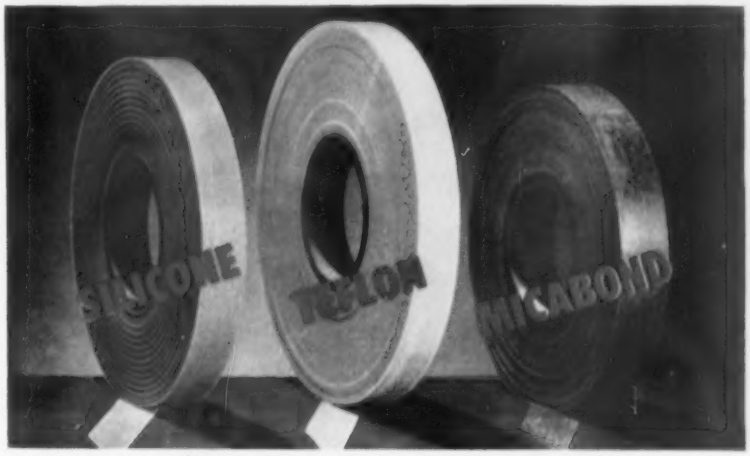
Heat-treated spiral bevel gears gives a smooth, constant transmission of power from the motor to the spindle. The motor operates at 4,250 rpm and the unit has a net weight of 10¾ lb and an overall length of 17¾ in. The tool is available for either 115 or 220 volt a-c or d-c operation. *Black & Decker Mfg. Co., Towson, Md.*

Rotary Shaft Seal

The BB-21A Mechanipak Seal is a mechanical seal for use on rotating shafts at pressures up to 150 psi. Standard construction



consists of a brass shell, brass washer, and Buna-N Bellows. Seals are available for shafts from ⅝-in. to 3-in. dia. Buna-N or Neoprene bellows are supplied for operating temperatures up to 212 deg F and pressures to 150 psi; silicone bellows are



Three CDF TAPES to meet your heat and electrical insulating needs

C-D-F Silicone Tapes for A.I.E.E. Class H Electrical Insulation. Available in Varnished Fiberglas cloth and Silicone Rubber-coated Fiberglas cloth. Resistant to high temperatures; high dielectric strength, low dielectric losses, excellent moisture resistance and high tensile strength. They resist mild alkalis, non-oxidizing acids, mineral oils, oxygenated solvents. Available in a range of sizes on continuous rolls. Write for Technical Bulletin #47.

C-D-F Tapes of Teflon* have the desired mechanical and electrical properties for heavy duty motor, generator, and conductor insulation. Unaffected by temperature fluctuations, exposure to oils and greases, or weather conditions. Fiberglas supported and unsupported Teflon tapes are available in a range of sizes.

C-D-F Micabond Tapes have an inherently high and permanent resistance to heat with good dielectric properties. Micabond Tapes are used for insulating motor and generator armature and field coils, turbogenerator coils, and many similar applications where flexible high quality insulation of A.I.E.E. Classes B and H insulators are required. Available in a wide range of sizes with many different backings including: fiberglas, silk, Cellophane*, cotton, paper, and Mylar*.

If you have an insulating problem, probably a C-D-F product is the answer. C-D-F manufactures and fabricates electrical insulation, laminated and molded plastics. Sales offices are located in principal cities. Call your C-D-F sales engineer—he's a good man to know!

*du Pont trademarks.

CDF Continental-Diamond Fibre

CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
NEWARK 104, DELAWARE

SPECIAL *APEX* HOLDERS AND TOOL BITS FOR ONLY "SELLERS" AXLE-FINISHING LATHES

For Economy, Increased Production, and Accurate Regrinding of Angles with Fixtures

Standard holders with inserted carbide-tipped tool bits reduce your costs and give improved working conditions. All tool bits are furnished finished ground with chip breakers and are ready for immediate use. Tool bits are adjustable in two directions to compensate for wear.

Full details mailed upon request.

The Apex Tool & Cutter Co., Inc.
Shelton 22, Conn.

See our complete line of tools for railroad work at Booth 855, The Production Engineering Show, Navy Pier, Chicago, Sept. 6-16.

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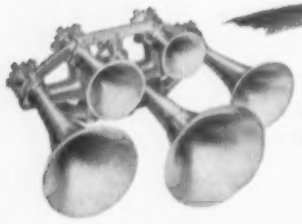
BEST BY TEST



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SEND FOR — Technical Data Sheet 531

LESLIE ® SUPERTYFON

LESLIE CO., 275 Grant Avenue, Lyndhurst, New Jersey

Hurry . . . while our head is still in the sand!

"NEW ONES FOR OLD"

Sweeney POWERENCH **EXCHANGE**

We have developed a new POWERENCH for use on the cylinder head crab nuts of E.M.D. 567 series engines. This "New Ones for Old" Exchange is offered for a limited time only to enable users of old style POWERENCHES to take advantage of the new style POWERENCH at a considerable savings. Here's the deal:

In exchange for your old style #224 or #225 series POWERENCH (regardless of its condition) we will give you a new, Model 104 POWERENCH at 60% of the regular price of the new POWERENCH.

Old style POWERENCH

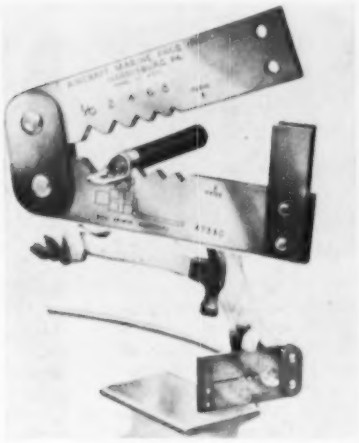
New style Model 104 POWERENCH

Lighter, the new Model 104 POWERENCH weighs only 28 lbs., compared to the 40 lbs. of old POWERENCHES. Stronger, the new units are strength tested to 10,000 ft. lbs. output, compared to the 5,400 ft. lbs. of the old units. More efficient, the new unit has a 12:1 power ratio, compared to the 7.2:1 ratio of the old units. The new unit will efficiently handle E.M.D. 567C engines, as well as 567, 567A and 567B. ***Write for particulars!***

E. K. SWEENEY MFG. CO. • DENVER 17, COLO.

used for temperatures up to 400 deg F where pressures do not exceed 50 psi.

The seals are designed for use on centrifugal pumps gear boxes, speed reducers, agitators and similar applications. They are said to eliminate wear on shafts and sleeves, to eliminate fluid leakage, and to cut maintenance costs. *Garlock Packing Company, Palmyra, N. Y.*



Wire Terminal Crimping Tool

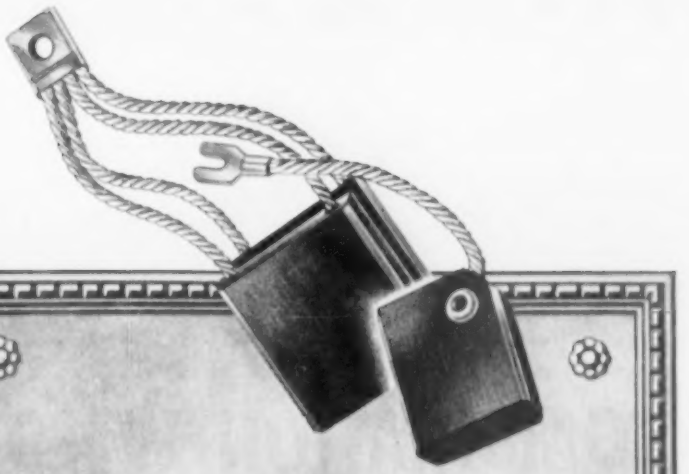
The Vize-An-Ammer, is said to offer the small maintenance shop a solution to the solderless wiring of stranded and solid wire in sizes ranging from 8 to 1/0, with A-MP terminals and connectors. The unit's diamond-shaped crimp is designed to produce a connection with maximum conductivity and tensile strength.

The unit is simply squeezed and hammered until the jaws meet to insure that a good crimp has been made. It is fabricated from heat-treated tool steel. *American Pamcor Inc., 1801 Hillcrest avenue, Havertown, Pa.*

Heavy-Duty Sander-Grinder

The tool is available in three different speeds and has a universal motor designed for continuous duty. Said to be more powerful than the previous model, the weight of this 9 in. device weighs four pounds less.

A centrifugal fan pulls air through the commutator section to provide a cool-running motor. This fan also keeps the motor almost entirely carbon and dust-free. The



Pioneers..
in better,
longer-lasting
brushes
for Diesels

STACKPOLE
Diesel-electric
BRUSHES
Backed by the keen personal interest and full cooperation of the specialists who produce them

STACKPOLE CARBON CO., ST. MARYS, PA.

lower steel inspection plate has been designed to act as a rub-cover and to seal the lower side of the tool from abrasive dust. Its operating switch is inclosed in a dust-proof compartment, and is guarded against being switched "on" accidentally.

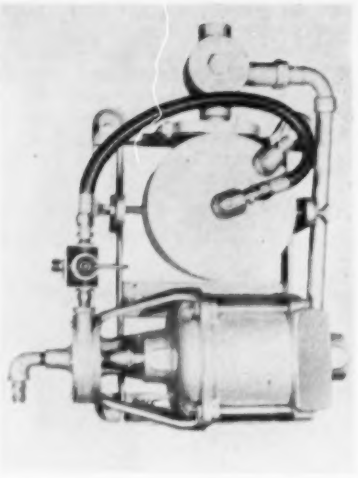
The device's rear handle is sufficiently large to afford ample finger room; and the side handle can be mounted on either the right or left side. A convenient locking pin permits easy accessory removal.

It is available in speeds of 4,200, 5,200 or 6,000 rpm with either a 115/or 220-volt motor for operation on either a-c or d-c. Overall length is 18 3/16 in. and weight is 14 lb. *Black & Decker Mfg. Co., Towson, Md.*

Burst-Proof Steam Hose Line

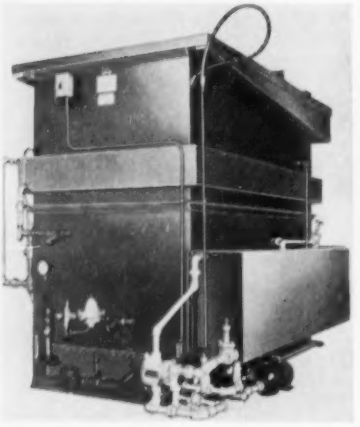
This burst-proof steam hose line, said to have longer life, higher efficiency, and maximum safety, has a grease-resistant cover for special applications. It is a combination of the manufacturer's little gem fitting and burst-proof steam hose, and can be used for applications up to 200 lb pressure. High temperatures do not affect the hose.

Both types of steam hose, No. 1524 standard and No. 2750 grease-resistant covered, are available in ½, ¾ and 1 in. sizes. *Aeroquip Corporation, Jackson, Mich.*



Spray Paint Heater

For hot spray painting, the Circaflo 300 provides uniform viscosity paint and a controlled application temperature. Longer life and better coverage are claimed for standard industrial finishes when applied with this hot-spray heater. The unit has a coilless heat exchanger and the Circaflo pump. This pump has no bearings or close tolerances to wear, and is equipped with a ¼-hp. explosion-proof electric motor. Two coats of finish can be replaced with a single, time-saving, sag-proof application of heat-reduced, high-solids paint. *Spee-Flo Corp., 720 Polk avenue, Houston 2, Texas.*



Heavy Duty Vapor Degreaser

This heavy duty degreaser has been developed to solve the problem of draining off heavily laden and contaminated degreasing solvent, permitting longer operation between cleanouts. The units, electric, gas or steam-heated, are suited for use by railroads, truck repair shops and heavy industry.

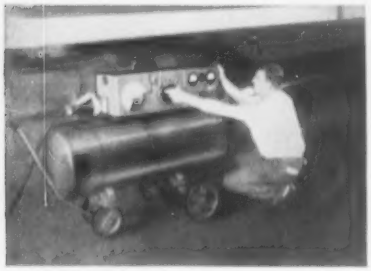
A double sump for sludge is a feature of the device. One of the sumps contains the heating element which brings the solvent

COMBINATION WELDER AND BATTERY CHARGER

NEW LINCOLN DUAL PURPOSE UNIT

- **WELDS**
- **CHARGES BATTERIES**

- Built in 200, 300, 400 amp sizes
- Repairs, hardsurfaces, builds railroad equipment
- Charges Lead-acid and Edison-type locomotive and car batteries



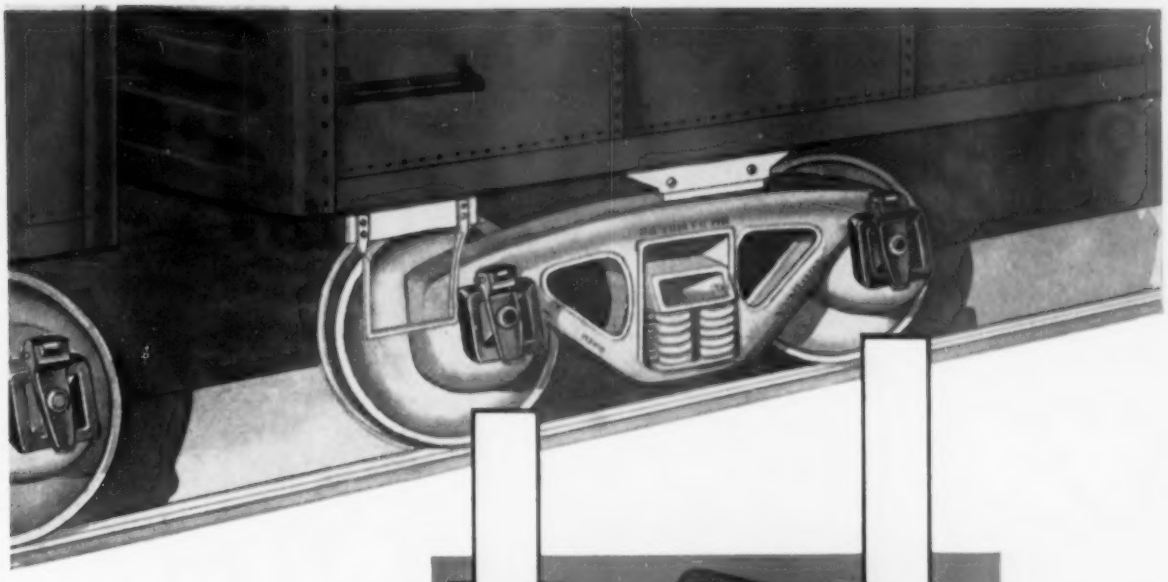
As a Charger — *Simple to Set for recommended charging rates of lead-acid or Edison-type batteries. Meter shows exact charging rate.*

As a Welder — *Provides all benefits of Lincoln Shield-Arc with Dual Continuous Control. Mounted on wheels for easy movement.*

Get Details Specifications on Lincoln Battery Charger and Welder combination are available by writing the Lincoln Electric Railway Sales Company, 11 Public Square, Cleveland 13, Ohio. • Railroad representative of:

THE LINCOLN ELECTRIC COMPANY

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



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"Iron Highways"
those who know
Specify

MOTOR WHEEL LIDS

Motor Wheel's time-tested lid design with full 4-way articulation . . . full pressed steel construction . . . and precision manufacture . . . provides *plus* protection against entry of destructive foreign matter.

Easiest of all lids to install or remove . . . *no tools needed.*

Millions of Motor Wheel lids now in use are giving dependable service.

STANDARD
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8 South Michigan, Chicago 3, Illinois

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number (s) on coupon below to receive desired information. Requests will be forwarded direct by the manufacturers.

1. **TWO-LEVEL COACH.** *Pullman-Standard Car Mfg. Co.* 4-page 2-color folder (J-2385) "New Pullman-Standard Two Level Suburban Coach Built For The Southern Pacific Railroad" describes and illustrates this new coach; includes partial list of materials and equipment used.

2. **DIESEL-ELECTRIC LOCOMOTIVES.** *Baldwin-Lima-Hamilton Corp.* 8-page 2-color 3-hole punched bulletin (2005) "General Specifications For Standard Units, Baldwin-Lima-Hamilton Diesel-Electric Locomotives" describes six of the company's locomotives now fitted with new electrical equipment.

3. **ROLLER BEARINGS.** *Dodge Mfg. Corp.* 52-page profusely illustrated bulletin (A-638) "Dodge Rolling Bearings" features the new SCM line of ball bearing pillow blocks and flange cartridge mounts, contains technical data and list prices on complete line of Dodge SC ball and Dodge-Timken roller bearings.

4. **CABLES.** *The Okonite Co.* 8-page 3-hole punched pull-out (OK-1069) "Okonite's Strip-Insulating Process", Its components . . . its features . . . its advantages in diagram style shows production, control and inspection methods used in manufacture of Okonite-Okoprene cables.

5. **ALUMINUM EQUIPMENT.** *Reynolds Metals Co.* June 1955 issue of *Reynolds Aluminum Digest* contains special article "Aluminum in Railroad Equipment" discussing use of aluminum alloys in construction of railroad rolling stock.

6. **CAR WHEEL BORER.** *Niles Tool Works, Baldwin-Lima-Hamilton Corp.* 12-page 2-color bulletin (101554) "Niles Hydraulic Wheel Borer" describes each operating component, illustrates and gives specifications for the hydraulic car wheel borer.

7. **POSITIONER.** *Worthington Corp.* 8-page 2-color bulletin (R-1700-B15) "It's Easy To Choose The Right Positioner" outlines seven basic points for consideration in positioner selection, photos illustrate parts.

8. **FORGINGS.** *National Forge & Ordnance Co.* 4-page folder "NF Product Examples" shows with many illustrations a variety of different forgings produced by National, including crankshaft for diesel driven compressor and diesel locomotive shaft.

9. **BRONZE GLOBE VALVE.** *Lunkenheimer Co.* 4-page 3-color circular 602 "Biggest Bronze Valve News in 50 Years! . . . The LQ600 Valve" illustrates and describes the new LQ600 bronze glove valve with Brinalloy seats and discs; includes cut-away parts identification drawing.

10. **POLYETHYLENE CABLE.** *Anaconda Wire & Cable Co.* 4-page 2-color folder (DM-5450) "Anaconda Cathodic Protection Cable" describes, diagrams, and gives specifications on the new direct burial Type CP cable with double jacket to check corrosion.

11. **SPOT WELDING.** *Air Reduction Sales Co.* 12-page reprint (ADR 93) "Spot Welding From One Side—With A Portable Gun" describes and illustrates Aircospot inert-gas-shielded tungsten—arc spot welding process.

12. **EYE SAFETY.** *Silicon Paper Company of America.* 14-page booklet on sight and eye safety covers the eye, how it works, how it can be injured through misuse, steps taken to aid recovery.

13. **FREIGHT CAR ENAMEL.** *Sherwin-Williams Co.* 4-page 2-color brochure (S-3495) "New One-Coat Cold Spray, The Equal of Two Standard Coats!" describes Kem-Kold Bild synthetic freight car enamel; includes technical data and application photos.

14. **LUBRICATED PLUG VALVES.** *Homestead Valve Mfg.* 28-page reference book (39-5) "Homestead Lubricated Plug Valves, Stem-Sealed Self-Freeing Plug" shows straightway, 3-way and multiple port lubricated plug valves for 250 pounds oil-water-gas and 150 pounds steam working pressure.

15. **COMPRESSOR.** *Ingersoll-Rand Co.* 4-page 2-color bulletin (1540) "Now, a 20-hp. Air-Cooled Compressor With The Famous I-R Channel Valve" describes and illustrates the I-R Model 20T compressor with I-R Channel Valve.

16. **VALVES.** *The Fairbanks Co.* 20-page reference manual "The Fairbanks Valve Comparison Chart" provides simple, easily read, easily referred to charts, detailing the complete Fairbanks line of bronze and iron-body valves compared with valves of other manufacturers.

17. **PRESSES.** *Cleveland Crane & Engineering Co.* 4-page 2-color catalog (2019-A) "Steelweld Single-Point Presses" describes, illustrates and gives specifications for the Steelweld line of Single-Point Presses ranging in size from 150 tons up.

Reader Service Department
Railway Locomotives and Cars
30 Church St., New York 7, N. Y.

SEPTEMBER, 1955

Please send literature circled below:

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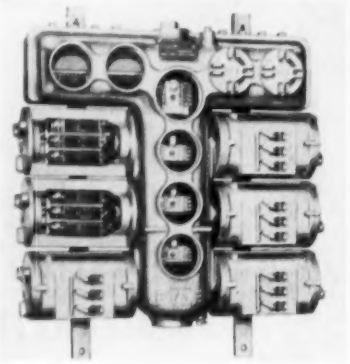
Company .....

Address .....

City ..... Zone ..... State .....

up to a boil. The other is a repository for the contaminated solvent which runs off from a drain plate above the boiling sump. A removable sludge pan can be emptied and replaced with a minimum interruption of work. A flusher pump and spray can be installed to flush out soil from recesses in the ports.

Units are available in four different standard sizes, handling work requirements from 4000 to 12,000 lb per hr. Vapor level is controlled by means of a water jacket. Automatic shut-off controls for protection against overheating are provided where required. The units are arc welded steel construction, reinforced, metallized and painted on the exterior with solvent resistant paint. *Phillips Manufacturing Company, 3541 W. Touhy avenue, Chicago 45.*



Explosion-Proof Panelboard

This unit, made in cast aluminum, has been designed for hazardous locations. Its triple-sectioned grooved joint meshes cover, end plate and body to form a continuous metal-to-metal explosion-proof seal. Approximately three turns of the end plate releases the cover for complete visibility and quick access to the branch circuit breakers.

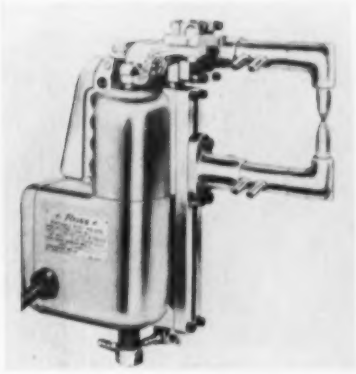
This EBP series is available in 2, 4, 6 and 8 gang types. The units take an E frame and Quicklag circuit breakers with from 2 to 24 branch circuit breaker controls. *Pyle-National Company, 1334 N. Koster avenue, Chicago 51, Ill.*

Electrically Conductive Lubricant

Primarily a lubricant, Conducto-Lube allows joint tension to be adjusted to original factory specifications so that full rated-capacity of the switch can be maintained at all times. It is said to eliminate any possibility of the switch balling up and freezing under extended use. It is highly conductive and will eliminate any hot spots in hinge switch joints caused by poor contact, thereby raising or restoring the rated capacity of the component. It can also be used for high speed air-blast breakers where a lubricant is essential. Its con-

ductivity will reduce resistance and heating.

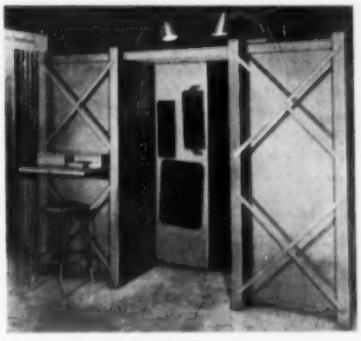
The product comes in 6 oz jars. *Conducto-Lube Company, 8603 S. W. 17th avenue, Portland 19, Ore.*



Portable Spot Welder

This self-contained unit, completely water-cooled, is enclosed in an aluminum housing. It features a built-in electronic timing control of the thyratron type, operating a solenoid contactor. Amperage is over 17,000 at the point of weld. The device has a throat depth of 6 in. with variable openings from 3 to 11 in., and can be used to weld steel and other metals of $\frac{3}{16}$ in. combined thickness. Tips of the unit are easy to replace and adjust.

Also available is a stand into which the welder, weighing only 55 lb, can be mounted for use as a foot operated floor model. *Ross Machine Tool Company, P. O. Box 122, Chicago Ridge, Ill.*



Template Filing Cabinet

The Templa-File contains a total of 24-36 in. by 80 in. numbered sliding panels. Each panel is suspended on rollers operating on roll-formed track. Its capacity is 2880 sq ft and each panel will independently support 600 lb of suspended weight. It provides an orderly system for filing and storing templates, patterns, gaskets and flat tools.

A self-contained record or reference desk folds into the unit when not in use. Attached to the desk is a swing-out tabulat-

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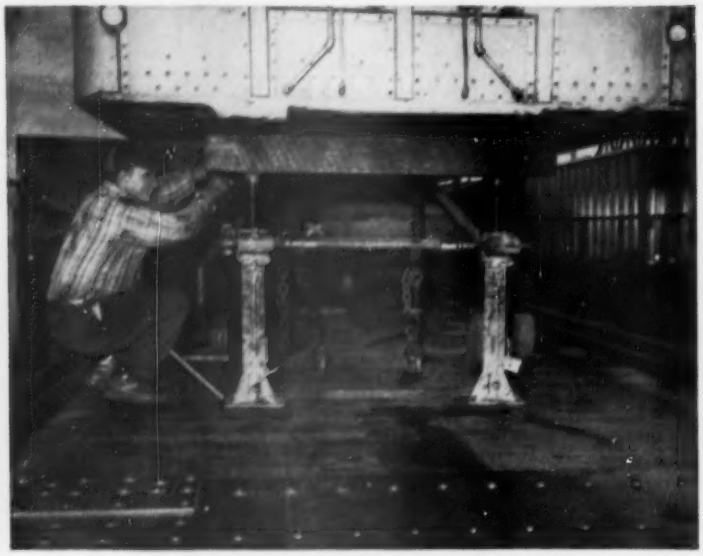


The Duff-Norton SK-1683 jack in use for piggy-back service.

Duff-Norton Special Jacks Help Assure Safe, Efficient "Piggy-Back" Service On Leading Roads

Many leading railroads naturally turned to Duff-Norton when they wanted special jacks to assure safe, economical piggy-back service. Six of the roads already have these Duff-Norton jacks in use. Others are working with Duff-Norton engineers in developing variations of them to suit particular methods of operation.

The men responsible for inaugurating piggy-back service on these roads know that Duff-Norton's long experience in designing and manufacturing jacks for special railroad uses gives them a dependable background for meeting this new situation. That is why the railroads whose trademarks you see here are using Duff-Norton jacks for piggy-back service. To learn more about these special jacks, write today to the Duff-Norton Company, P.O. Box 1889, Pittsburgh 30, Pa. Canadian Plant: Toronto 6, Ontario.

DUFF-NORTON Jacks

"Giving The Railroads A Lift Since 1883"

ing file card for ease in locating or filing.

The unit is 9 ft 6 in. wide, 31 in. deep and 7 ft high. Net weight is 1,500 lb. Finish is grey bonderized baked-on enamel. *DeLuxe Metal Furniture Company, 306 Struthers street, Warren, Pa.*

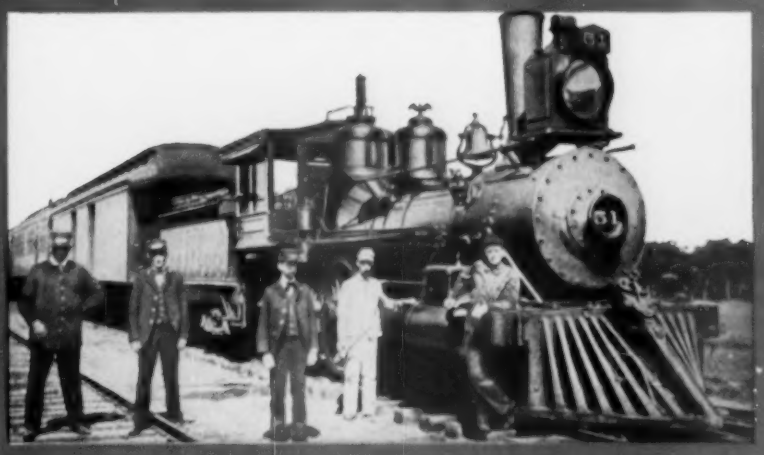
Fire-Preventive Drum Cover

The Thermo-Acting drum cover can convert any used steel drum or standard trash can into a fire-preventive container. It produces a safe receptacle for oily rags, paints, solvents, packing materials, or waste paper. The red-painted cover is a sturdy, snug-fitting steel stamping attached with a special hinge to an adjustable steel band. The band is placed around the upper part of the drum with cover closed for correct positioning. The wing nut on the band is then tightened and the cover raised ready for use. Normally, the cover is open to receive waste materials, held in position by the hinge's spring plunger unit which contains a low melting point fusible link. Should a fire occur inside or outside the can, the fusible link melts, releases the spring loaded plunger, and closes the lid.

The fusible links are quickly and easily replaced. Covers are available to fit 55-gal and 30-gal steel drums, standard trash cans, and 11-in. diameter pails. *Protecto-seal Company, 1920 South Western avenue, Chicago 8.*

Hand Cleaner

A liquid hand cleaner, Rid, is said quickly to remove paint, grease, oil, grime, putty and other stubborn dirt from the hands. It can be used either with or without water. The cleaner contains no abrasives or ammonia, but does contain lanolin and an antiseptic that is reported to remove germs from the skin surface. It is sold in self-dispensing cans of half-pint and pint size. *Fern-Wey Company, 11705 Detroit avenue, Cleveland 7.*



No. 51, a 4-4-0 built by Cooke in 1877, had a splendid record over the turn of the century as power plant for the famed Frisco "Meteor" on the St. Louis-Oklahoma City run. Note the fancy cab and other handsome adornments of this veteran.

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ARACAR—journal box oils	VARSOL—Stoddard Solvent	Asphalt
ARAPEN—brake cylinder lubricant	SOLVESSO—Aromatic solvent	Cutting Oils
ESSO XP Compound—hypoid gear lubricant	ESSO Weed Killer	Rail Joint Compounds
	ESSO Hotbox Compound	Maintenance of Way Products
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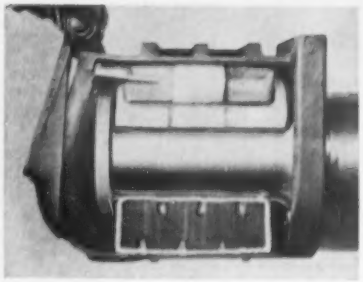


Journal Lubricating Pad

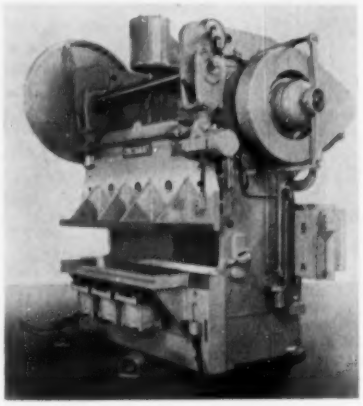
The Redipak is a block of specially processed Neoprene enclosed by heavy cotton wicking material. The capillary action of the open cells in the neoprene and the pumping action produced by a series of holes molded in the top and bottom of the block provide oil feed. Additional oil is brought to the journal surface by the wicking action of the cotton cover which is also claimed to filter out foreign material.

The Redipak is installed by hand and without tools. The top and bottom are identical and the pad is square so that it is claimed this device can not be applied improperly. Ring-shaped grommets at the corners simplify removal because a hook can be used to pull the device from under the journal collar. Laboratory tests are said to prove that this device will operate at higher temperatures and have longer life than waste or felt pads. Life is estimated at about 50,000 miles or three years of service.

Test installations of this device have been in passenger service since 1954. The AAR has given approval for installation of 8,000 of these pads in limited interchange service. This device is made in five sizes for the standard journals from 4¼x8-in. to 6½x12 in. *National Bearing Division, American Brake Shoe Company, St. Louis 10.*

Drill Lubricant

Metalube is a lubricant said to increase tool life and to speed drilling, tapping and reaming operations. Using this material, it is stated that for some applications the holes produced by drilling are so accurate and well finished that no reaming is necessary. It can be used on all metals. Metalube is supplied in tubes, and in cans from pint to 5-gal. size. *Protective Coatings, Inc., Box 3985, Detroit 27.*



Press Brake

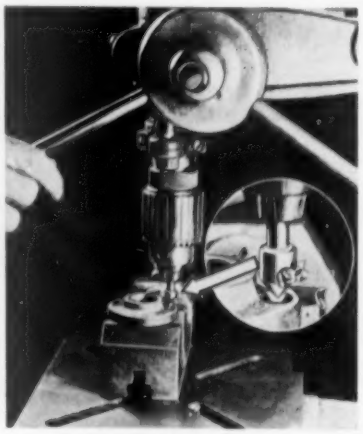
Shallow draw work and various press operations can be done on this all-steel press brake which has a 36-in. wide bed and ram, a shut height of 15 in., and an 8-ft overall die surface. Six 12-in. air cushions are mounted on the underside of the bed, front and back. The two foot pedals operate as a single control, or can be operated separately. An interlocking feature on the foot pedals insures safety, particularly in multiple press operations.

The press brake is driven through an air-electric clutch with automatic stop and non-repeat controls. It has a two-speed transmission with speeds of 13 and 30 strokes per min, and a 5-in. stroke. There is an air counterbalance. Total weight is 17 tons. *Cincinnati Shaper Company, Cincinnati 25.*

Solid Carbide Countersink

This countersink, fabricated from solid carbide tool steel, has a non-cutting edge that is flattened and is higher than the cutting edge. A round chip clearance hole is centered in the cutting edge to permit a smooth flow of chip waste. Construction is said to eliminate chatter and insure exact cutting in one operation.

The device has an 82-deg included angle and is available for screw size Nos. 5, 6, 8 and 10. Larger sizes, ¼ up to ½ in., can be ordered with or without a pilot to fit any diameter required. Its recommended speed is 250 to 500 rpm. *Raymac Division, Dexco Corporation, 15490 Dale avenue, Detroit 23.*



BANISH THE BIGGEST CAUSE OF HOT BOXES

Cut-away illustration shows the simplified design of U.S. EVER-PAC and the absence of metal parts. Oil is fed to the journal through the wick pad, which receives its supply by capillary action from integral wicks, pumping action, and from the oil-saturated synthetic sponge rubber pad.

with the new, proven U. S. EVER-PAC*

Here at last is the Journal Lubricator that meets the railroads' chief demand:

Makes "waste-grabs" and other failures of waste packing impossible!

No costly special oil seals required!

Interchanges with present equipment!
(No shop modifications, machining or additional labor costs)

Low-cost initial installation!

Easy determination of oil level!

Low-cost upkeep!

Trouble-free service!

71% of hot boxes are directly attributable to waste packing, mostly "waste-grabs." Ever-Pac makes "waste-grabs" impossible!

U. S. Ever-Pac has A.A.R. approval for application to a specified number of cars which move in general interchange service (Docket No. L-129).

Years of intensive research and testing show conclusively that with U. S. Ever-Pac, a product of United States Rubber Company, a major cause of hot boxes can now be eliminated.

EVER-PAC GIVES FULL 3-WAY OIL SUPPLY, MILE AFTER MILE. The reservoir on its underside holds 2 pints of oil, and the sponge rubber pad holds 2 pints more—2 full quarts of oil at all times. Plus 3-way oil delivery:

(1) *Capillary action soaks up oil.* The hungry wick is oil-absorbent. The yieldable sponge rubber, a specially developed synthetic compound, provides a cushioned *upward* contact at all times, providing a controlled rate of *clean* oil distribution.

(2) *Pumping action.* Each vertical or lateral movement of the journal or journal box compresses the pad, thereby setting up a pumping action which pumps oil from the reservoir under the pad through holes to the distributing wick pad.

(3) *Sponge pad flexing.* Each movement of the journal or journal box flexes the *yielding* pad and makes the pad "breathe out" *even more oil*—because the pad retains 2 pints of oil *above and beyond* the amount of oil in the oil reservoir.

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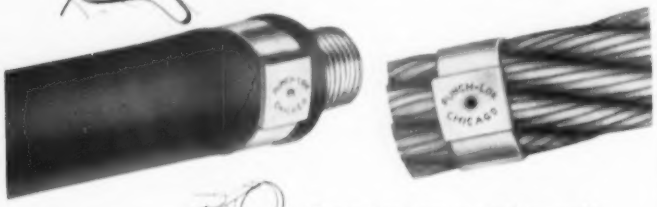

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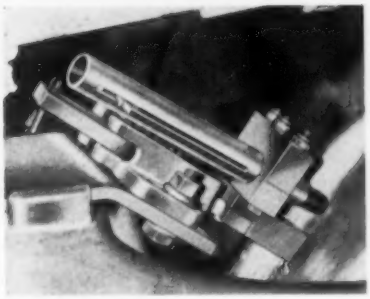
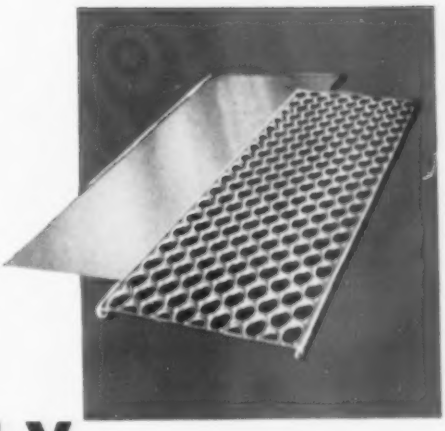


Flange Lubricator

This flange lubricator uses dry molybdenum-disulfide stick-type lubricant and has a guide shoe which keeps it aligned with the wheel. It has four parts—the housing, slide bar, stick tube, and guide shoe. There are no springs or regulating mechanism requiring adjustment. The molybdenum-disulfide is said to provide high film-strength lubrication which does not pick up dirt or other abrasives. It is also said that there is no track fouling or traction losses. *National Aluminate Corporation, 6216 West 66th Place, Chicago 38.*

Marker Light

The Midget marker light was designed for general rear-of-train and locomotive use and particularly for cabooses with low-voltage electric systems. Only one-third normal size and lighter in weight, this marker is said to have greater beam intensity and better visibility than standard markers. The light has an integral mounting bracket that fits standard AAR holders and is adjustable to any angle. Color aspects are changed by loosening the self-retained knurled thumb screw at the top



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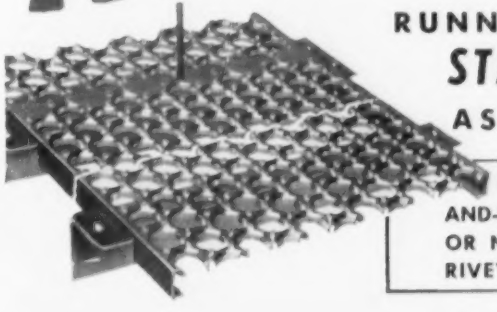

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and turning the hood to the desired color position. By completely loosening the thumb screw, the hood can be removed to change the double-contact bayonet-base clear lamp, or to work on wiring or the receptacle. A heavy beaded chain holds the hood to the base while it is removed. Lenses are held in the hood by molded snap-in gaskets. A rubber O-ring is used for the weatherproof seal between the hood and the bracket base. A rubber bushing cord grip is furnished at the bottom for the entry of the cord. *Pyle-National Company, 1334 N. Kostner avenue, Chicago 51.*

Abrasive Cutting Machine

Speed-Cut, an abrasive cutting machine, is designed to cut all shapes and types of materials. The high speed abrasive wheel is said to cut hard or soft materials with ease, and the cut surface is said to be so smooth that it seldom needs further finishing. The machine has a quick-acting, foot-controlled chain vise that holds even irregular shapes immovable during the cutting operation with only slight pressure.

A welded steel wheel guard completely shields the wheel at all times. This guard attached to the balanced one-piece tilting table, rests on a heavy gage metal shield, giving extra operator protection during cutting. The machines have permanently sealed double-row ball bearings. Two sizes are built. The No. 20, with a 20-in. abrasive wheel running at 2,300 rpm, can

cut a 6-in. pipe or a 2½-in. solid round or bar. The No. 14, with a 14-in. wheel running 3,000 rpm, can sever 4-in. pipe or a 2-in. solid rod or bar. *Beaver Pipe Tools, Inc., Warren, Ohio.*

Tripod Power Drive

Hand pipe tools can be power-operated with this small, lightweight power drive on a folding tripod. The legs and integral tray fold up compactly and can be chained in this position. It can then be carried by the built-in handle on the power unit. There is no leg at the front to interfere with the swing of the die stock handles.

The power unit has a motor of special

design and uses the Ridgid speed chuck which is quickly opened or closed with a handwheel. A centering device at the rear automatically centers and holds pipe. The power unit is also equipped with pipe benders and slots for hanging tools. The capacity of the Ridgid No. 200 is pipe from ⅛-in. to 2-in., and ¼-in. to 2-in. bolts *Ridge Tool Company, Elyria, Ohio.*

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Dimensions: only 11" x 12" x 7½"

Weighs only 65 lbs.— Carry it to the job!

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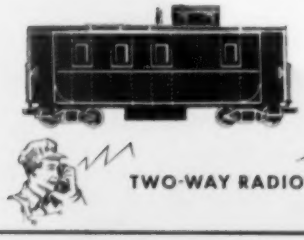
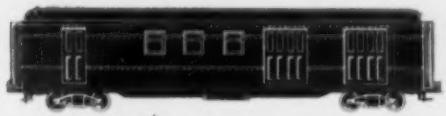


TWO-WAY RADIO



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REFRIGERATION

The new, small ½ to 5 KW Spicer *Positive Gear* Generator Drive makes available to caboose, baggage, refrigerator, and mail cars, all the advantages of steady, ample electrical current.

And the new Spicer Drive delivers the power for this ½ to 5 KW current with all the standards of efficiency and dependability established by the large, time-proved Spicer *Positive Gear* Generator Drive. More than 11,000 large Spicer Drives are now in use on over 70 railroads all over the world.

The Spicer Railway Generator Drive for radio, lighting, refrigeration and other electrical equipment consists of a very simple application of quiet, long-lived spiral bevel gear and pinion mounted at the end of a standard axle, thereby permitting rapid inspection and maintenance. The drive from the gears is positive and constant through Spicer Universal Joints and Propeller Shaft to the Spicer Safety Clutch which is attached to the generator. This safety clutch absorbs heavy shock loads and disconnects the drive line in case of an excessive overload, thus protecting the generator from damage.

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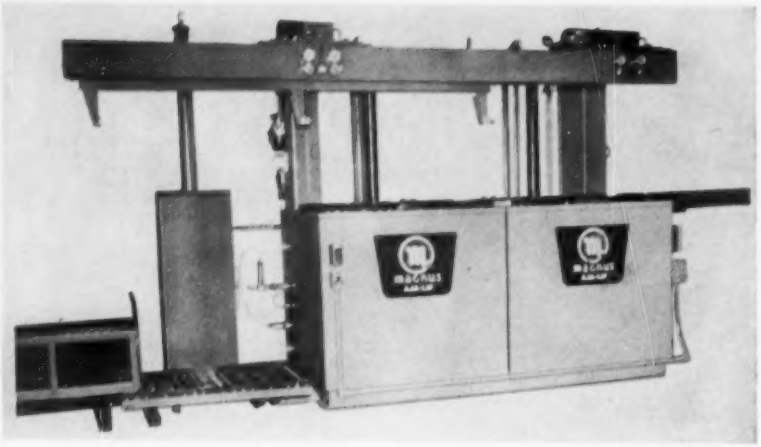
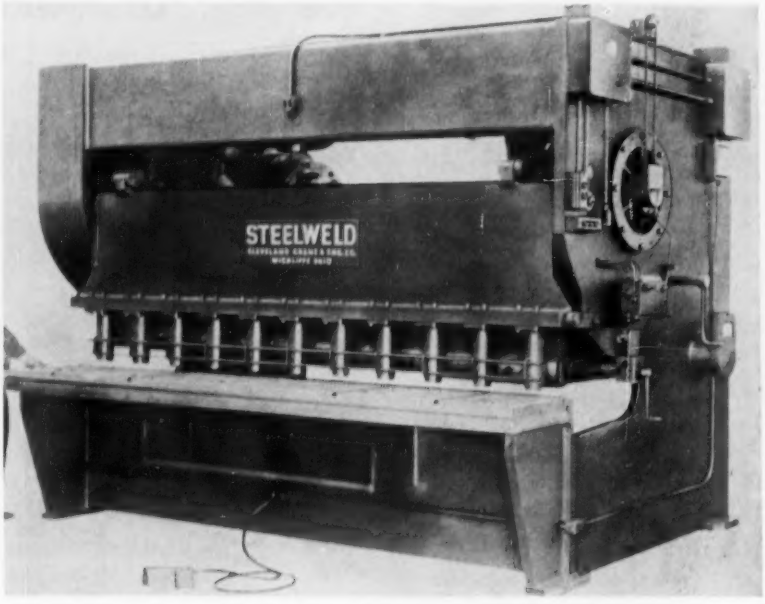


Mechanical Agitation Cleaning Machine

This air powered "Aja-Lif Automatic" is equipped with a "nu-matic push device" and "air lift loading." The work to be processed is pushed at floor level onto a lifting roller platform which automatically raises the work to the top of the cleaning machine. At the same time similar roller platforms in each tank rise to the same level. Then a pushing device with collapsible dogs transfers each batch of work one step forward at each cycle.

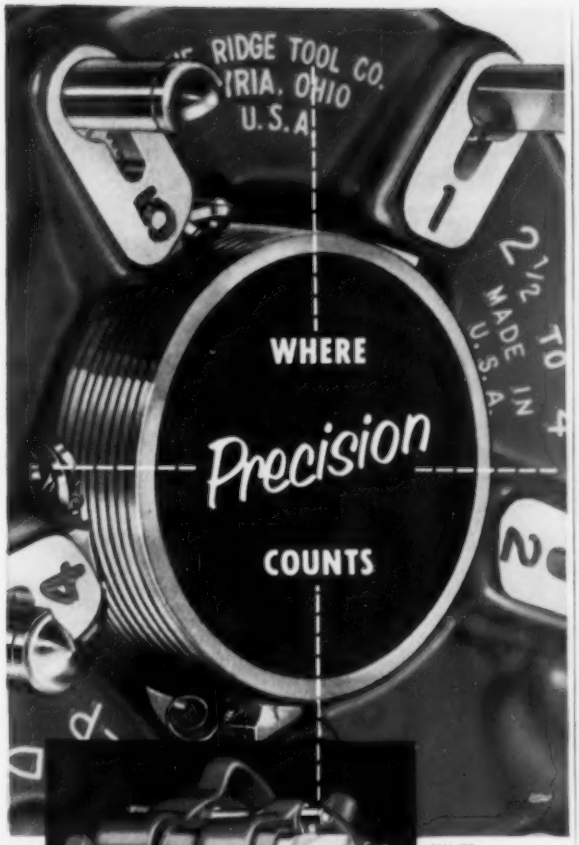
A timing device, synchronizes the drive unit with the loading unit. The platforms in each tank are lowered in the cleaning solution and agitated for a period of time, after which the platforms automatically rise again. At this moment the "nu-matic push drive" transfers the baskets one more step and the process repeats itself indefinitely.

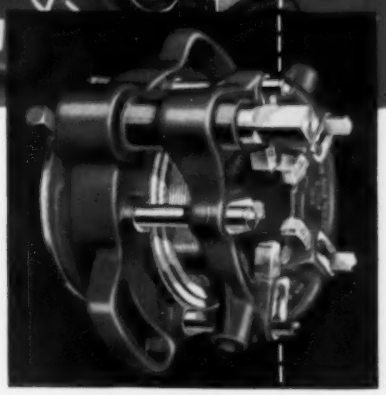
The unit can be designed for any number of operations and for use with solvents, alkalies, or acids. It requires no special foundation. *Magnus Chemical Company, Inc., Garwood, N.J.*



Shear

The Steelweld Shear will cut mild steel up to 12-ft x ½-in. It operates on a pivoted-blade principle—the blade travels in a circular path without the use of guides and slides common with guillotine-type shears. It is claimed that this eliminates a source of wear and shearing inaccuracies. The shear has a cool running air-operated clutch and brake that are said to be fast and positive acting. A Micro-set knife adjustment makes possible a simple, rapid adjustment of knife clearance to suit the thickness of the metal being cut. The press can be controlled by an electric foot switch that is moved around the floor to the spot most convenient for use. *Steelweld Machinery Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio.*





...use the RIDGID 4P

2½" TO 4" GEARED PIPE THREADER

Here's a work-saving precision tool that cuts accurate threads on 2½" to 4" pipe *every time.* It's easy to handle . . . easy to use . . . foolproof.

Operated manually or with power, the RIDGID 4P reduces time, sweat and scrap in any piping job. Balanced handles simplify carrying and starting on pipe. Mistake-proof workholder sets to size *before* tool is put on pipe . . . has only one screw to tighten . . . no bushings.

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See your local supplier . . . or write direct for catalog.

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proved in daily use!

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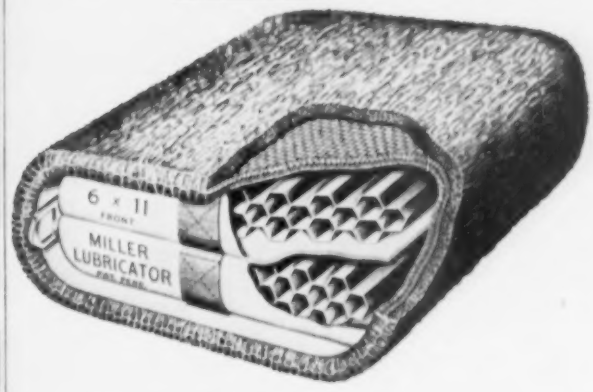
CARSETS STILL GOING STRONG AFTER AS LONG AS 2½ YEARS SERVICE!



typical **MILLER JOURNAL BOX LUBRICATOR** users:

RAILROAD

- **A** adding 2000 *more* carsets!
- **B** adding 2000 *more* carsets!
- **C** just placed *18th re-order* in 2 years!

6 YEARS life expectancy—3 years of maintenance-free operation on *each side* of the Miller Journal Box Lubricator. The 2 re-packs that you save substantially pay for the original investment of $40 per carset. (Has AAR limited approval for 36 month repack.)

A one-piece non-mechanical pad that can be installed in minutes per carset—winter or summer; day or night—without jacking the journal box, and without altering the journal box.

ELIMINATES!

- ▶ WASTE GRABS
- ▶ SERVICING ENROUTE
- ▶ OILING ENROUTE
- ▶ SPECIAL WINTER SERVICING

There's a KEY to improved journal lubrication waiting for you at BOOTH 136 at the Allied Railway Supply Convention, Hotel Sherman, Chicago, Sept. 11—14. Or mail this coupon, and we'll send the key to you.

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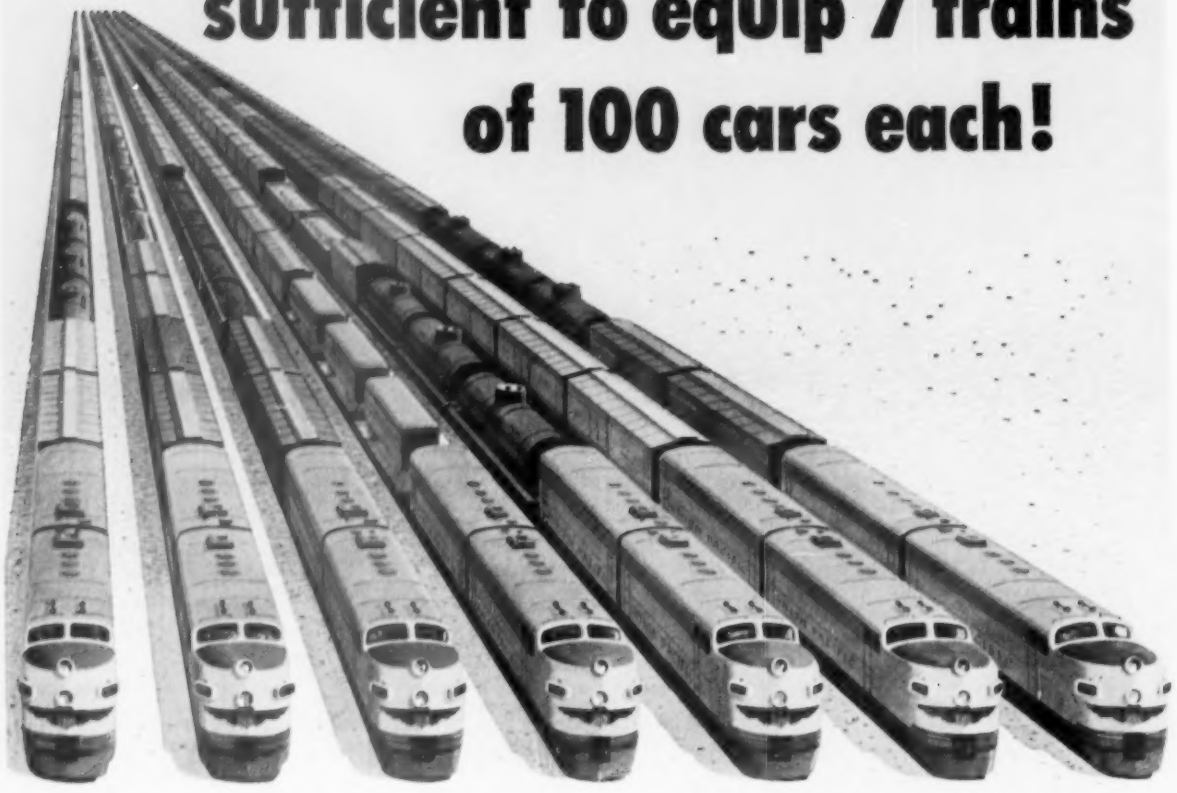
More and more NMB Sealed Journal Box Lubricating Systems† for America's Leading Railroads!

U.P. orders Lubricating Systems sufficient to equip 7 trains of 100 cars each!



Acceptance of the service-proved NMB System is snowballing! Prove to yourself, on your line, that the NMB System gives these vital benefits!

- **PRACTICALLY ELIMINATES BRASS END WEAR**
- **ELIMINATES 81.4%* OF ALL HOT BOXES**
- **REDUCES OIL CONSUMPTION 90%**
- **REDUCES INSPECTION TIME 90%**
- **ELIMINATES VIRTUALLY ALL ACCIDENTS CAUSED BY HOT BOXES**

SEE WORKING MODELS OF NMB SYSTEM AT ALLIED RAILWAY SUPPLY ASSOCIATION EXHIBITION SEPT. 11, 12, 13, 14, SHERMAN HOTEL, CHICAGO

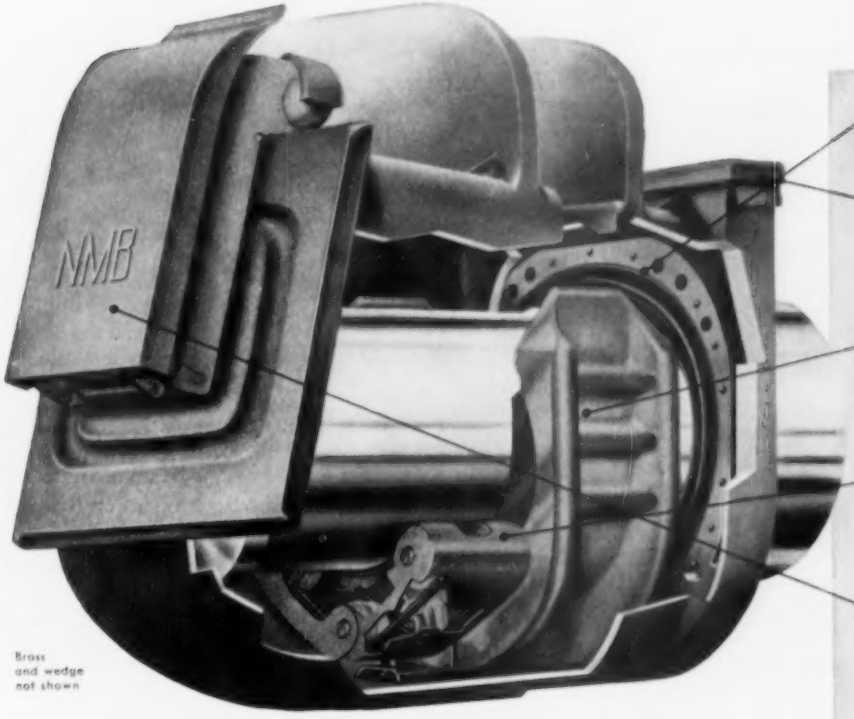
MAKE THIS SIMPLE TEST

Equip 10 solid bearing cars with the NMB System. Net costs vary, according to journal size, from $232. to $267. per car. Operate under all possible conditions. Bearing end wear will be cut to an unbelievable 0.0006" per 1,000 car miles. Inspection will be needed only once a month. Oil consumption will drop to about 1 oz. per 1,000 journal box miles. Hot boxes will be virtually eliminated!

These predictions are based on actual experience in over 9,000,000 journal box miles of operation by major Class I railroads. This same experience shows cost of the NMB System can be completely amortized in 18 months, and thereafter savings of $6.88 per 1,000 car miles are attainable.

NMB Lubricating System uses "long" solid bearings; is quickly installed without journal box alteration

A.A.R. APPROVED FOR INTERCHANGE SERVICE ON 10,000 CARS



Brass and wedge not shown

5 PRINCIPAL PARTS

A. OIL SEAL. Keeps oil in; dirt, water, brine and snow out.

B. DUST GUARD WELL COVER and FILTER. Exclude dripping water, snow, brine; yet permit breathing.

C. JOURNAL GUARD BEARINGS. Eliminate axle damage during humping, coupling, starting or heavy braking.

D. OIL CIRCULATOR. Lubricates bearings with ½ turn of axle. Guarantees continuous lubrication. Bearings run 50° cooler.

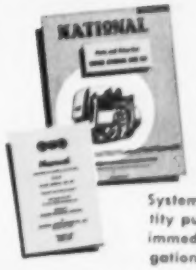
E. JOURNAL BOX LID and WAFFLE GASKET. Provide tight oil and water seal at front opening. Eliminate vibration wear.

The NMB Sealed Journal Box Lubricating System†

is the result of applying modern automotive engineering principles to a century-old railroad problem. Developed by NMB in collaboration with 3 major western railroads, the NMB System provides modern, sealed oil bath lubrication and exclusion of foreign matter from solid bearing journal boxes.

Installation is made in the standard A.A.R. journal box. No alteration is required. Waste packing formerly used for lubrication is eliminated (no waste grabs). NMB Systems for 5" x 9", 5½" x 10" and 6" x 11" A.A.R. standard solid bearing journal boxes can be shipped promptly.

* Based on operating experience of major Class I railroads
† "Patented" and "Patents Pending"



NEW MANUAL describes simple, inexpensive installation steps. **PARTS & PRICE LIST** shows all System parts, gives quantity purchase prices. Sent immediately without obligation.

NATIONAL OIL & GREASE SEALS O-RINGS SHIMS

5470

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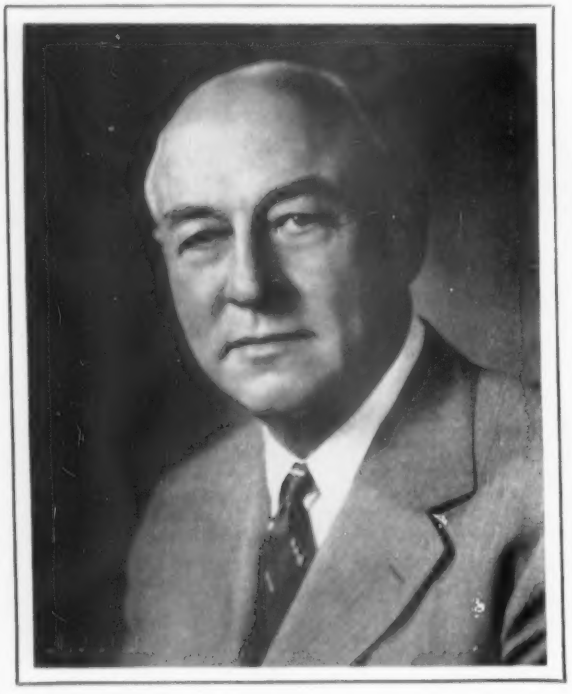
NMB has manufactured tens of thousands of oil seals for roller bearing cars and over 1,000,000,000 oil seals for AUTOMOBILES • TRUCKS • TRACTORS • AIRCRAFT • MACHINES • HOUSEHOLD APPLIANCES

AN IMPORTANT MESSAGE FROM THE SECRETARY OF THE TREASURY

A THREE-WAY PARTNERSHIP THAT BENEFITS EVERYBODY

How the public, the magazine publishers and the U. S. Government cooperate to help keep the nation's economy growing always stronger

AS a reader of this magazine, the chances are that you belong to a "three-way partnership" dedicated to intelligent saving and a sound economy. For you probably buy United States Savings Bonds. Nearly 40 per cent of the families in America own them. Most Bond-owning families have saved enough in this way to pay for a serious illness, to provide something for old age, to make a down payment on a house or take a long trip. And perhaps most important, these families have the wonderful feeling of security that the ownership and holding of these Bonds bring.



Americans today are buying Savings Bonds at an annual rate of more than $5,000,000,000. In the time it takes you to read this page, approximately one minute, America will buy $10,000 worth of Series E and H Bonds!

How, you may ask, did this come about?

It came about through a great program of voluntary cooperation with the Treasury Department on the part of many groups, organizations and citizens. The magazine publishers have from the beginning been among the major supporters of the Bond program. They contribute millions of dollars' worth of advertising space each year.

Full credit for making Bond-buying a national habit is due that "three-way partnership"—the American citizen, the Government, and the volunteer groups, such as the magazine publishers, who bring buyer and seller together through the pages of their publications.

All three partners will profit further by continuing to help increase the nation's saving through the sale of Savings Bonds.

For so effectively promoting the national welfare I wish, on behalf of the Government, to extend to the magazine publishers our most sincere thanks.

George Humphrey

Secretary of the Treasury

Space contributed by
RAILWAY LOCOMOTIVES AND CARS

in your rebuilding program

the GRIPCO Brake Beam Safety Support

SPRING PLANK TYPE

gives added safety at minimum cost

can be designed for ANY Brake Beam

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.

SPRING-PLANKLESS TYPE (Safety Loops Included)

1. Supports the brake beam in event of brake beam or hanger failure.
2. Holds brake beam in horizontal position.
3. Holds brake shoes in proper position in relation to the periphery of the wheel.
4. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
5. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
6. Gripco Supports can be removed and replaced without removing nuts.
7. Gripco Supports also function as a foundation brake gear control.
8. Brake Beams, rods and levers are held in position under spring tension thus reducing false movements, chattering and wear of parts to a minimum.

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

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Grip Lock Nut #1 | Grip Holding Nut #2 | Railroad Gripco Lock Nut

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Serving American Railroads Since 1904

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SPIN TORQUE CHUCK

The Perfected Chuck-Locks Tight with a

Spin of the handwheel!

● No more rocking, socking or hammering with the new "TOLEDO" SPIN TORQUE CHUCK. Now you can chuck ⅛" to 2" pipe, or rod as small as ¼", with a spin of the handwheel. Jaws are flush with chuck—exclusive rocking wedge action of jaws prevents slipping—husky "big hand" grip on wheel is easier to tighten — no end thrust slippage. See them at your pipe tool suppliers, now. Next time try "TOLEDO".

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Adams & Westlake Company, The ... 12, 13
Agency—Henri, Hurst & McDonald, Inc.
Aircraft-Marine Products, Inc. ... 23
Agency—Kenner Advertisers
Albertson & Co., Inc. ... 32
Agency—E. W. Sann & Assoc.
Aluminum Company of America ... 54
Agency—Fuller & Smith & Ross, Inc.
American Brake Shoe Co., Brake Shoe & Castings Division ... 24, 25
Agency—Doyle, Kitchen & McCormick, Inc.
American Brake Shoe Co., National Bearing Division ... 99, 100
Agency—Fuller & Smith & Ross, Inc.
American Brake Shoe Co., Southern Wheel Division ... 44, 45
Agency—Fuller & Smith & Ross, Inc.
American Hair & Felt Co. ... 30
Agency—Oscar P. Holtzman Advertising
American Steel Foundries, King Machine Tool Division ... 113
Agency—Keelor & Stites Co.
American Steel & Wire Division, United States Steel Corporation ... 4, 5, 101
Agency—Batten, Barton, Durstine & Osborn, Inc.
Apex Tool & Cutter Co., Inc., The ... 116
Agency—Claude Schaffner Adv. Agency
Armco Steel Corporation ... 52
Agency—N. W. Ayer & Son, Inc.
Association of Manufacturers of Chilled Car Wheels ... 42
Agency—Schuyler Hopper Co., The
Baldwin-Lima-Hamilton Corporation ... 110
Agency—Ketchum, MacLeod & Grove, Inc.
Bethlehem Steel Company ... 58
Agency—Jones & Brakeley
Brake Shoe & Castings Division, American Brake Shoe Co. ... 24, 25
Agency—Doyle, Kitchen & McCormick, Inc.
Buckeye Steel Castings Co., The ... 109
Agency—T. J. Stead, Advertising
Buffalo Brake Beam Company ... Inside Front Cover
Bullard Co., The ... 31
Agency—Park City Advertising Agency
Columbia Geneva Steel Division, United States Steel Corporation ... 4, 5, 101
Agency—Batten, Barton, Durstine & Osborn, Inc.
Continental-Diamond Fibre Division of The Budd Company, Inc. ... 115
Agency—Geare-Marston, Inc.
Dana Corporation ... 129
Agency—Clifford A. Kroening, Inc.
Dayton Rubber Co. ... 20, 21
Agency—Allman Company, Inc. The
Duff-Norton Company ... 122
Agency—Bond & Starr, Inc.
Equipment Research Corp. ... 107
Agency—W. S. Kirkland Advertising
Esso Standard Oil Company ... 123
Agency—McCann-Erickson, Inc.
Ex-Cell-O Corporation ... 23
Agency—Holden, Clifford, Flint, Inc.
Exide Industrial Division-Electric Storage Battery Co. The ... 98
Agency—Geare-Marston, Inc.
Fairbanks, Morse & Co. ... 64
Agency—The Buchen Company
Garlock Packing Company, The ... 114
Agency—Hutchins Advertising Co., Inc.
General Electric Co. ... 36, 37, 47
Agency—G. M. Basford Company
General Steel Castings ... 33
Agency—Oakleigh R. French & Assoc.
Giddings & Lewis Machine Tool Co. ... 40, 41
Agency—Klau-Van Pietersom Dunlap, Inc.
Griffin Wheel Company ... 111
Agency—Erwin, Wasey & Co.
Grip Nut Company ... 135
Agency—Ross Llewellyn, Inc.
Gulf Oil Corporation ... 26
Agency—Young & Rubicam, Inc.
Holland Company ... 49
Agency—Van Auken, Ragland & Stevens
Hyatt Bearings Division of General Motors ... 55
Agency—D. P. Brother & Co., Inc.
Industrial Brownhoist Corporation ... 11
Agency—Price, Tanner & Willox, Inc.
Ingersoll-Rand ... 27
Agency—Marsteller, Rickard, Gebhardt and Reed, Inc.
International Nickel Company, Inc., The ... 53
Agency—Marschalk & Pratt Co., Inc., Div. of McCann-Erickson, Inc.
Johns-Manville ... 34
Agency—J. Walter Thompson Company
Joy Manufacturing Company ... 38
Agency—Walker & Downing
Kasson Die & Motor Corporation ... 128
Agency—Lawrence Peskin, Inc.
King Machine Tool Division, American Steel Foundries ... 113
Agency—Keelor & Stites Co.
Leslie Co. ... 116
Agency—Mercready, Handy & Van Denburgh
Lewis Bolt & Nut Company ... 124
Agency—E. T. Holmgren, Inc.
Lincoln Electric Company, The ... 118
Agency—Griswold-Eshleman Co.
Linde Air Products Company, a Division of Union Carbide and Carbon Corporation ... 56
Agency—J. M. Mathes, Inc.
Magnaflux Corporation ... 61
Agency—Glenn Jordan Stoetzel, Inc.
Magnus Chemical Co., Inc. ... 112
Agency—Spooner & Kriegel
Magnus Metal Corporation ... 57, 66
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.
Met-L-Wood Corporation ... 48
Agency—Armstrong Advertising Agency
Miller Lubricator Co. ... 131
Agency—Kerker-Peterson & Associates
Miner, Inc., W. H. ... Front Cover
Morton Manufacturing Company ... 127
Agency—W. S. Kirkland Advertising
Motor Wheel Corporation, T-Z Railway Equipment Co. ... 119
Agency—Young & Rubicam, Inc.
National Aluminate Corporation ... Inside Back Cover
Agency—Armstrong Advertising Agency
National Bearing Division, American Brake Shoe Co. ... 99, 100
Agency—Fuller & Smith & Ross, Inc.
National Carbon Company, A Division of Union Carbide and Carbon Corporation ... 43
Agency—William Esty & Co.
National Malleable and Steel Castings Company ... 50, 51
Agency—Palm & Patterson, Inc.
National Motor Bearing Co., Inc. ... 132, 133
Agency—L. C. Cole Company
Oakite Products, Inc. ... 1
Agency—Marsteller, Richard, Gebhardt and Reed, Inc.
Pennsylvania Salt Mfg. Co. ... 59
Agency—Geare-Marston Inc.
Pullman-Standard Car Manufacturing Company ... 8, 9
Agency—Fuller & Smith & Ross, Inc.
Punch-Lok Company ... 126
Agency—Merrill & McEnroe & Assoc., Inc.
Radiator Specialty Company ... 128
Agency—Bennett Evans Company
Ridge Tool Company, The ... 131
Agency—Penn and Hamaker, Adv.
Rust-Oleum Corporation ... 46
Agency—O'Grady, Anderson & Gray, Inc.
Service Foundry, A Division of Avondale Marine Ways, Inc. ... 60
Agency—Whitlock-Swigart, Inc.
Simplex Wire & Cable Co. ... 35
Sinclair Refining Company ... 16, 17
Agency—Morey, Humm & Johnstone Inc.
Southern Wheel Division, American Brake Shoe Co. ... 44, 55
Agency—Fuller & Smith & Ross, Inc.
Speer Carbon Co. ... 103
Agency—Hazard Advertising Company
Stackpole Carbon Company ... 117
Agency—Harry P. Bridge Co.
Stratoflex, Inc. ... 130
Agency—Magnussen & Teague
Sweeney Mfg. Co., B. K. ... 116
Agency—Curt Freiberger & Co.
Tennessee Coal & Iron Division, United States Steel Corporation ... 4, 5, 101
Agency—Batten, Barton, Durstine & Osborn, Inc.
Texas Company, The ... 62
Agency—Erwin, Wasey & Company, Inc.
Timken Roller Bearing Company, The ... Back Cover
Agency—Batten, Barton, Durstine & Osborn, Inc.
Toledo Pipe Threading Machine Co., The ... 135
Agency—The Jay H. Maish Co.
United States Rubber Company ... 15, 125
Agency—Fletcher D. Richards, Inc.
United States Steel Corporation, United States Steel Export Company ... 4, 5, 101
Agency—Batten, Barton, Durstine & Osborn Inc.
Unit Truck Corp. ... Inside Front Cover
Van Der Horst Corp. ... 121
Waugh Equipment Company ... 7
Westinghouse Air Brake Company ... 2
Agency—Batten, Barton, Durstine & Osborn, Inc.
Wine Railway Appliance Co., The ... 105
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This simple device on your diesel or steam locomotive wheels . . .

. . . loaded with Nalco "Moly" Stick dry lubricant . . .

. . . gives you

- Better flange lubrication
- Lowered lubricating costs
- Longer wheel life
- Less lubricator maintenance
- No traction losses
- No track fouling

SIMPLICITY, plus low installation and upkeep costs for *really effective dry flange lubrication* are yours with Nalco "Moly" Stick Lubricators. This new concept in flange lubrication utilizes a molybdenum disulfide type lubricant which has high film strength under pressure and does not pick up dirt or other abrasives. Tests in service show that "Moly" Sticks provide better lubrication and far outwear any other type of stick lubricant.

Write for Bulletin 551 for more cost-saving data on Nalco Flange Lubricators—Or ask your Nalco Representative for details.

NATIONAL ALUMINATE CORPORATION
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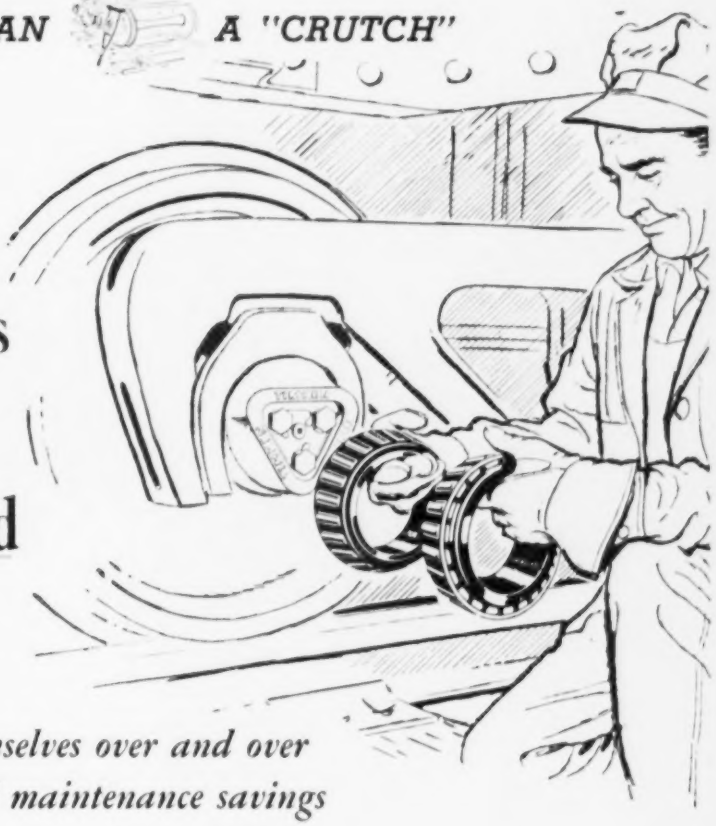
Nalco®

PRODUCTS . . . Serving the Railroads through Practical Applied Science

A CURE IS BETTER THAN *A "CRUTCH"*

With Timken® bearings the Hot Box Problem is Cured



. . . and they pay for themselves over and over and over in operating and maintenance savings

UNLIKE devices that merely serve as "crutches" in an attempt to improve friction bearing performance, Timken® tapered roller bearings *cure* the hot box problem because they eliminate the *cause* of hot boxes: the friction bearing itself.

You not only cure the hot box problem with Timken bearings, you also end the frequent inspection and lubrication needed to keep friction bearings functioning. Terminal inspection time is cut 90%. Lubricant cost is reduced as much as 89%. When all railroads go "Roller Freight", they'll save $190 million a year, net a 22% annual return on the investment.

"CRUTCHES" CAN'T PREVENT LUBRICATION FAILURE

Timken bearings don't slide the load. They *roll* it. Their roller bearing design ends lubrication problems and the need for frequent inspection. Even the addition of protective "crutches" is no guarantee against lubrication failure in friction bearings.

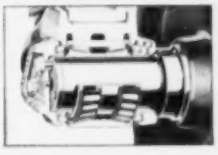
The taper makes Timken the only roller bearing you can count on to cure the hot box problem and cut costs to the bone. It prevents lateral movement. There's no scuffing—bearings last longer; there's no pumping action—less lubricant is needed. Rollers can't skew to upset full line contact. To make Timken bearings tough enough to meet the demands of rugged railroad service, we use nickel-rich steel. And we make it ourselves to insure quality every step of the way. No other bearing maker does.

PRICE GAP BECOMING SMALLER

The price gap between friction and roller bearings has already been narrowed by the Timken heavy-duty bearing assembly, which cuts the cost of roller bearings 18% to 25%. The expense of buying and maintaining auxiliary "crutch" devices for friction bearings narrows the gap still more. And now, one major railroad has instituted a systematic method of converting to roller bearings which, if adopted generally, can make the difference in price even smaller.

Every car that comes into this railroad's shops for major repairs is being converted to roller bearings. This system encourages a steady shop and labor schedule, reduces the cost of bearing installation, and allows the railroad to pay for its conversion over a period of years.

HERE'S HOW IT CAN PAY OFF

If other railroads would adopt such a program, the resulting steady flow of orders for roller bearings would enable the Timken Company to effect substantial manufacturing economies. These, in turn, would be passed along to you in the form of lower prices. You can see it will really pay to *roll* your freight cars on Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

Only **TIMKEN®** bearings cure the hot box problem and cut operating and maintenance costs to a minimum